

MARINE REVIEW.

VOL. V.

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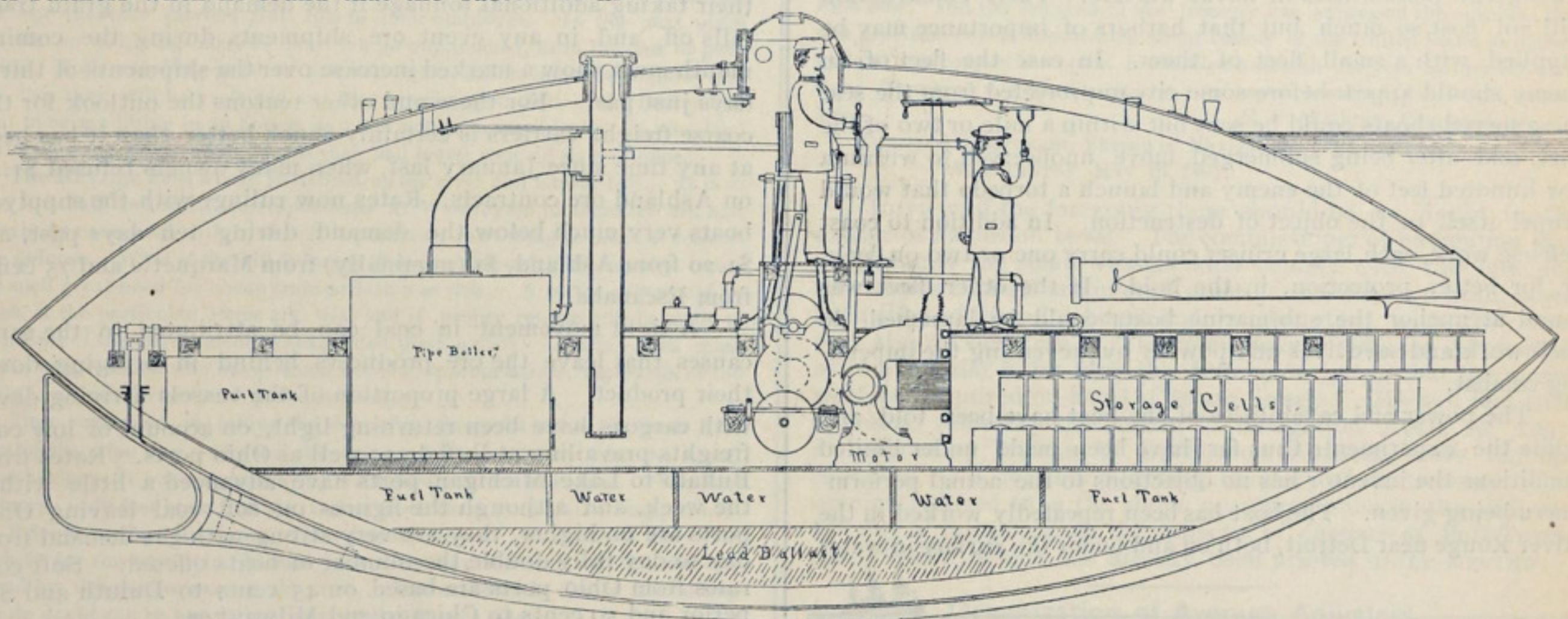
Baker Sub-Marine Torpedo Boat.



It may seem strange to naval architects and mechanical engineers that a Chicago business man should invent and have built a successful sub-marine boat. The most practical results in navigation under water were obtained by Nordenfeldt, but the first experimental trials of the boat illustrated below have proven it to be much more practical and efficient than the one mentioned. The inventor's name is Mr. George C. Baker. He

has been engaged in business in Des Moines, Ia., for over fifteen years, and for the past two years in Chicago, and only gave up his business when he found that the success of his invention

hull being 16 feet. There are five water-tight compartments 2 feet deep between the deck and the ballast hold, but two of them can be used for oil tanks if desired. The boat is self-contained and needs no shore connections to drive it. The driving power is in duplicate, an electric plant and a steam plant, the former for running under water and the latter for surface propulsion, the steam plant being so arranged that it can be used to generate electricity for charging the storage batteries. This boat is believed to have the largest storage battery plant in the world. It consists of 236 Woodward cells of 700 ampere hours' capacity, installed by Mr. H. H. Humphrey of Detroit. They are divided into two parts and are worked in multiple. The cells are connected with a 50-horse power Jenny motor, which is thrown in gear with the main shaft when it is desired to sink the boat and run under water. The steam plant consists of a 4½ by 5½ feet Roberts' water tube boiler, which has a patent telescopic stack. This stack is lowered and the stack hole covered when fire is not required. The boiler is fed by a Worthington pump. The 7x7 inch Willard engine can be thrown in gear with the main shaft, and it can also be belted to the motor, which is turned into a dynamo by changing brushes and revers-



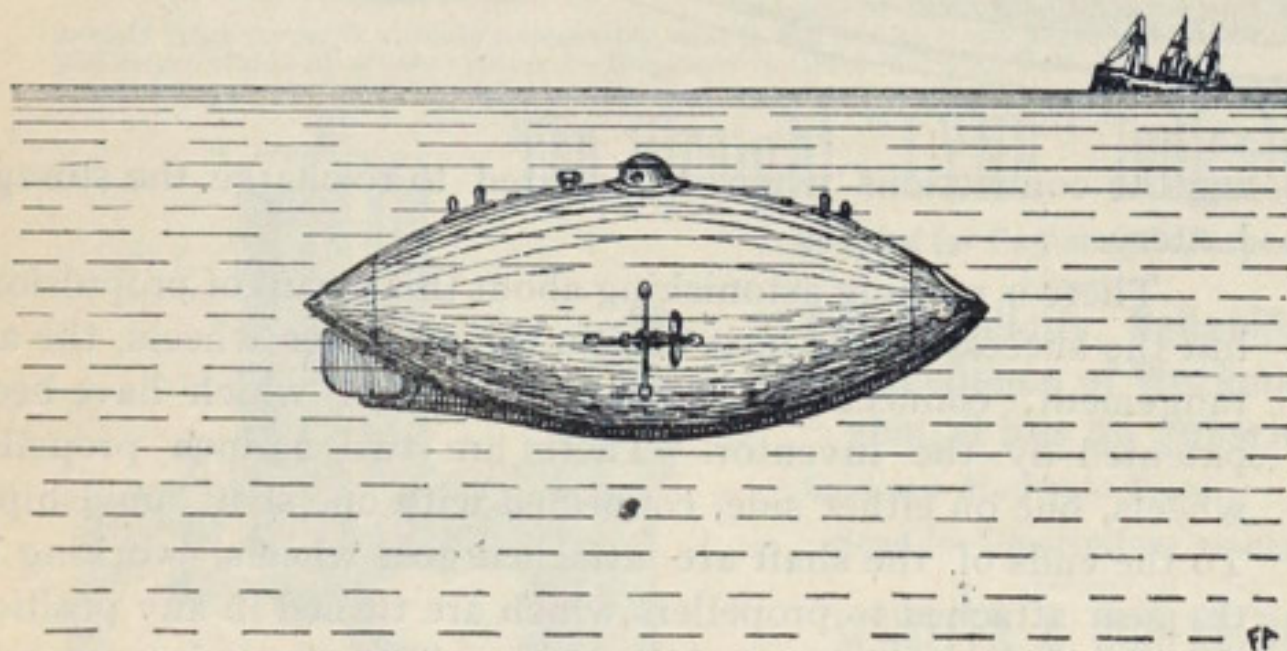
warranted it. For six or seven years he has made experiments in tanks and has studied the effect and forces of water as an amusement rather than with a view to applying his knowledge to anything so intricate as a sub-marine boat. Over a year ago he decided to have an experimental craft built, and an order was placed with the Detroit Boat Works, Detroit, Mich, F. P. Ballin, N. A., for the hull and driving machinery. The construction of a hull to withstand the pressure at a depth of 80 or 100 feet was no easy problem, but it was solved by using three-inch oak plank six inches wide sawed in cylindrical form, so that a number of pieces joined together made a frame, the frames diminishing in size from the center frame being bolted together so as to form the spheroidal hull. The longitudinal sections are parabolic and the cross sections ellipses. This hull was covered with canvas and then longitudinally planked with two-inch plank. The dimensions of the hull are 40 feet over all, 9 feet beam and 14 feet deep, from top of conning tower to bottom of

ing the connections when it is desired to re-charge the storage battery.

There is nothing astonishing about this means of propulsion, but the success of the boat lies in the propeller wheels, the arrangement, connection and manipulation of which have been patented by the inventor. There are two 24-inch propeller wheels, one on either side, connected with one shaft amidships. To the ends of the shaft are attached gear wheels, working in the gear attached to propellers, which are turned in any position by means of a sleeve around the shaft. This sleeve is connected to a handwheel with chain belting. By means of this hand-wheel the propellers may be placed in any position. The propellers are protected by brackets from coming in contact with any obstruction. The rudder fits close to the hull and the boat answers to it readily. It will be understood by the foregoing description that such a boat would have no difficulty in running at the surface, but the following description of a descent will ex-

plain its sub-marine capabilities. The boat has about 75 tons displacement, the hull weighing 20 tons, the ballast 30 tons, the storage battery cells 10 tons, engine and boiler and gearing 8 tons, and motor 3 tons, leaving 4 tons buoyancy. The normal draft of the boat leaves about two feet of the crown of the hull above water. The pilot and electrical engineer enters through a man-hole in the conning tower and the cover is drawn over and fastened, when the boat is air-tight. If it is considered that the hull contains 1,500 cubic feet of air, a sufficient supply for two men eighteen hours, the possibility of suffocation is removed. The electrically connected pump is started and two or three tons of water is pumped into the water bottoms, this additional weight leaving nothing of the boat above the surface except the top of the hull and conning tower. To sink directly downward the wheels are turned perpendicular to the shaft and the motor is started. The amount of spare buoyancy determines the amount of power necessary to sink the boat. When the desired depth is attained then the propeller wheels are turned at an angle of about 45 degrees and the boat is propelled forward, neither rising nor sinking unless the pitch of the wheels is changed. When the commander or pilot wishes to ascend the machinery is stopped and the reserve buoyancy causes the boat to rise to the surface. Any accident that would stop the machinery would also cause the boat to ascend. The storage battery plant contains enough power to run the boat three hours at a speed of eight miles an hour. The stability and capability of the boat to withstand heavy weather is unquestionable, but if it is desired to avoid a heavy storm it is only necessary to submerge the boat, ascending for fresh air occasionally. It presents great possibilities in naval warfare. Their construction will not cost so much but that harbors of importance may be supplied with a small fleet of them. In case the fleet of an enemy should appear before some city unprotected from the sea, these torpedo boats could be sent out within a mile or two of the fleet, and after being submerged, move unobserved to within a few hundred feet of the enemy and launch a torpedo that would propel itself to the object of destruction. In addition to coast defense work, each large cruiser could carry one or two on deck, or, for better protection, in the hold. If the other fleet was found at anchor the sub-marine boats could be launched, do their work and save lives and powder by preventing the impending combat.

The power and capabilities of the boat have been told, and while the experiments thus far have been made under limited conditions the inventor has no objections to the actual performances being given. The boat has been repeatedly worked in the River Rouge near Detroit, both on and under the surface in water



from fifteen to twenty feet deep. This has been done simply to test the working of the machinery and becoming familiar with the action of the boat. More recently the boat has been worked in the Detroit river with a depth of about forty feet, a strong current and with many boats passing, making it a very difficult place to operate such a craft.

The conning tower cover was closed over the two occupants, Mr. Baker and Mr. Goddard, at ten minutes to 2 o'clock P. M.

and remained closed until 4:35, two hours and forty-five minutes, in which time no unpleasant atmospheric effect was noticed. When the boat was opened the air seemed as fresh and invigorating as when at first closed. During this trial the boat was repeatedly submerged, disappearing entirely from sight and leaving no disturbance on the surface to note the location of the submerged craft. The boat retained its even keel beneath the surface and answered readily in rising and lowering to the requirements of the pilot. Altogether, the tests so far have been very satisfactory and will be continued from time to time until the full capacity of the boat is developed. If the boat continues to develop, as it now promises, it will be heard of in naval warfare.

Lake Freight Matters.

A steady, strong feeling with rates fairly profitable are features that have characterized the lake shipping business during the past week, and in fact since the first trips were made in April. The strength is due almost entirely to the heavy grain movement from Chicago and the head of Lake Superior to the seaboard, and although stocks in Duluth and Chicago elevators have decreased on the whole to about half the aggregate at the opening of navigation, there is as yet little falling off in shipments and the Chicago rates hold to the best figures of the season, while the decline at Duluth has been only fractional. Under these conditions iron ore shippers have moved only a very small portion of their product uncovered by contract tonnage. They have been in the market all along for boats but have been very conservative in the matter of shipments, on account of limited sales, as compared with the two previous years. This will necessitate their taking additional tonnage if the demand in the grain trade falls off, and in any event ore shipments during the coming month must show a marked increase over the shipments of thirty days just past. For these and other reasons the outlook for the coarse freight carriers is certainly much better than it has been at any time since January last, when many owners refused \$1.25 on Ashland ore contracts. Rates now ruling, with the supply of boats very much below the demand during ten days past, are \$1.20 from Ashland, \$1 (nominally) from Marquette and 75 cents from Escanaba.

A light movement in coal can be attributed to the same causes that leave the ore producers behind in bringing down their product. A large proportion of the vessels arriving down with cargoes have been returning light, on account of low coal freights prevailing at Buffalo as well as Ohio ports. Rates from Buffalo to Lake Michigan ports have advanced a little within the week, and although the figures on soft coal leaving Ohio ports are no higher, they are very strong with the demand from day to day fully double the number of boats offered. Soft coal rates from Ohio ports are based on 45 cents to Duluth and Superior and 50 cents to Chicago and Milwaukee.

Grain at Chicago and Duluth.

Stocks of grain at Chicago and Duluth on Monday, May 16, were as follows:

	Chicago.		Duluth.
	Wheat, bu.	Corn, bu.	All wheat, bu.
In store.....	7,291,720	1,093,140	6,309,663
Decrease last week.....	373,389	530,084	3,680,061
Excess over same time last year....	3,113,946	208,326	3,786,848

In addition to the above there is 839,219 bushels of oats, 323,866 bushels of rye and 16,951 bushels of barley in store in Chicago.

Wrecks and Heavy Losses.

Only two accidents of minor importance have been reported during the past week. The steamer W. P. Thew, owned by R. Thew of Cleveland, and valued at \$30,000, was burned at Chicago, but it is thought that she can be rebuilt by an expenditure of something like half her value. On Thursday the schooner Josephine, owned by Capt. Frank Perry of Sault Ste. Marie and valued at \$3,800, was sunk in collision with the Aloha at Lake George flats. The loss will probably amount to the full value of the boat.

CHICAGO LAKE INTERESTS.

WESTERN OFFICE, MARINE REVIEW,
No. 13 Western Union Building, CHICAGO, ILL., May 19. }

The Pennsylvania railroad has been conducting some experiments in the way of handling grain by all rail, which may have a very important bearing upon lake business in the end. The road has added to its equipment cars of thirty-three tons capacity especially built for this trial. In the first experiment it put forty-four of these cars filled with corn behind a specially large engine, and ran the solid train without breaks to Philadelphia. In the second trial last week a solid train of twenty-five cars was sent through, also without break. Experts accompanied the train to note the cost and amount of power required to move the grain. If in the end the Pennsylvania Company decides that it can make money in competition with the water route, it is expected that arrangements will be made to run solid trains between Chicago and the seaboard carrying nothing but grain and flour. The effect upon the lake grain freights of such a movement would be very marked. It would mean that so long as lake freights are very low the water route would get the business, but as soon as rates began to climb up the railroads would step in and stop the boom before vessel men had a chance to make large dividends. It is understood that these experiments will be continued until the Pennsylvania officials know the exact cost of transporting a single bushel of grain from Chicago to the seaboard, the cars and locomotive being especially adapted to the trade.

Grain shows no tendency to move more freely out of Chicago, and it is fortunate that just at the time when the bottom was ready to drop out of grain the ore trade took the boats. Otherwise a doleful history of the spring of 1891 would have repeated itself. The grain that is not going forward now, must move later in the season, and that means a big rush of business before many months. There are some people here who would not be surprised at seeing the highest rates in years paid on grain before the season is six months old.

In view of the disappearance of Capt. Egan and the treatment accorded poor Ben Smith, who came here from Milwaukee early in the season to establish a shipping office, it must be repeated right now that if the new lake carriers' shipping office is to be anything more than a farce, half-hearted measures will not do. First of all Capt. Egan must be found if alive, and if dead that fact must be established. It will take both money and energy to accomplish this but the lake carriers owe this to their employees. In the next place assaults on shipping masters must not go unpunished, as in the case of poor Smith. Both shipping masters and non-union sailors must both know and feel that they will be protected and that attacks upon them in the inalienable right to earn a living in an honest way will not go unpunished. If the lake carriers are not prepared to do this they had better shut up shop at once.

The REVIEW does wisely in defending the river and harbor bill. It is so easy for half informed correspondents at Washington to abuse the bill and everybody connected with it, that it is positively refreshing to read a reasonable defense. What if the bill is larger than ever before? The country never had such great need for cheap transportation as now. A better way would be to ask if the particular items are wise and if proper returns will be made to the people if the government has expended their money. Marine men must sustain congressmen who have voted needed appropriations, regardless of the howls of a misinformed and partisan press.

Tugs succeeded in taking the steamship Susquehanna to the Santa Fe's elevator the other day. She was the largest boat yet taken past the Canal street bridge. It was a tight squeeze with hardly an inch to spare. The Susquehanna is 40 feet beam and six inches more beam would have stopped her.

Friends of Capt. Patterson of the burned steamer W. P. Thew deny with much fervor the report in Chicago papers Monday morning that the fire was caused by drunkenness among the crew. The evidence in denial is so strong that no doubt can be entertained against the Thew's master.

Among Canadian Owners.

Special Correspondence to the MARINE REVIEW.

KINGSTON, Ont., May 19.—Some time ago the case of Wright vs. Collier was tried by Judge Rose. The plaintiff's schooner Two Brothers and the defendant's steamer Reindeer collided on the Bay of Quinte, and Wright sued for \$2,000 damages. The judge secured the consent of both parties to consult two experts, and in his judgment he adopted their conclusions, and gave a verdict for the plaintiff. The defendant appealed, claiming that the experts had not heard the evidence and that while he did not consent to accept the conclusions of the experts, he was entitled to the independent judgment of the judge. The court has allowed the appeal on the opinion that the manner of proceeding in the first place was irregular. There will therefore be a new trial, which will prove most interesting to mariners.

O. E. Thorpe of Chicago is trying a novel experiment. He has chartered the steamer Wergeland to bring a full cargo of herrings from Norway to Chicago through the canals. The vessel is now at Montreal, where a portion of her cargo is being placed on a barge for Kingston, where the Wergeland will reload from the barge and then proceed on to Chicago. If the experiment proves a success a new trade will be opened up. The steamship will get a return cargo at Montreal.

Western vessel men are now discussing the proposed action of the United

States government to impose tolls on freight passing through the Sault canal and bound for Canadian ports. They claim that generally the embargo would not affect the Canadian vessel interests. The chief sufferers would be the Canadian Pacific Railway Company, whose vessels do the main trade in bringing down the northwest grain. They further think that if the United States government carries out its intention in this respect the Canadian government should interpret the treaty as do the Americans and allow no United States craft to pass through the Welland canal with a load on. This, they claim, is what has been done for some years on the Erie canal, which is solely under the control of the United States.

John Miller, special inspector of foreign steam vessels in behalf of the United States government, was here last week and inspected the Canadian craft that will ply in American waters. Canada has no such officer to inspect American vessels that ply in Canadian waters.

The Montreal Transportation Company has just laid the keel of a new schooner for a lake tow, which will carry from 60,000 to 70,000 bushels.

Names on Bows of Steamers as well as Sail Vessels.

Editor MARINE REVIEW:—I am in receipt of your letter, dated the 6th instant. You state in your newspaper of the 28th ultimo that "In the matter of names on bows of steamers the inspection service had sent to local boards a circular declaring that they were not required." I would like information showing what circular letters or instructions, written or verbal, of such tenor were given specially to inspectors by any competent authority. The records of the bureau do not show that such instructions were sent to them from this office, and it is observed that the supervising inspector-general of steam vessels in his communication dated the 23rd ultimo, printed in your paper, states specifically as follows: "In reply to this I have to inform you that no circular upon the subject referred to has been prepared or issued from this (his) office."

It is not understood that the officers of the government concerned in the administration of the laws governing the marking of names are in any doubt as to the course to be pursued, or that any further instructions to them regarding the matter are necessary at present. The law provides plainly that "the name of every documented vessel of the United States shall be marked upon each bow," and the solicitor of the treasury has expressed the opinion that this provision covers documented steam vessels of the United States as defined by law. A copy of the opinion is enclosed herewith for your further information. Thanking you for the interest your paper has displayed in the matter, I am,

E. C. O'BRIEN, Commissioner.

Treasury Department, Bureau of Navigation,
WASHINGTON, May 16, 1891.

In view of the foregoing there should be no doubt in the matter of names on bows. The commissioner of navigation says very plainly the steam vessels must comply with the law, and this means that all steam craft must have names on both bows, both sides of the pilot house and on the stern with the home port also on the stern. The commissioner asks for information as to a circular letter from the bureau declaring that the names were not required on bows of steam vessels. He will find such a circular issued by the bureau of navigation April 16, 1891, and signed by William W. Bates, commissioner, with the approval of A. B. Nettleton, acting secretary of the treasury. The opinion referred to in the above communication is the one answering a question from the collector of customs at Port Townsend, Wash., which has already been printed in the REVIEW.

Organization of Average Adjusters.

Through invitations sent out by representatives of insurance companies—not general agents—doing business on the lakes, a meeting of average adjusters was held in Detroit Tuesday and an association formed. There was present at the meeting Messrs. Sandrock, Lovering, Robinson and Hitchcock of Buffalo, Kellogg, C. A. Macdonald and Burton of Chicago, Harbeck, White and McDonald of Detroit, Manning, Bartlett, Foote and Scott of Cleveland and Tuttle of Milwaukee. The organization, to be known as the Lake Board of Average Adjusters, was perfected through the election of Capt. Manning of Cleveland as president and Mr. McDonald of Detroit as secretary, and the appointment of a committee on arbitration, to consist of Messrs. Tuttle of Milwaukee, Robinson of Buffalo and White of Detroit. Although no official announcement has as yet been made of the relations of the underwriters toward this board, it is understood that no adjustment will be accepted unless coming from members of the board named above, and that a set of uniform rules will govern all future adjustment cases, differences to be referred to the arbitration committee, whose decisions are final.

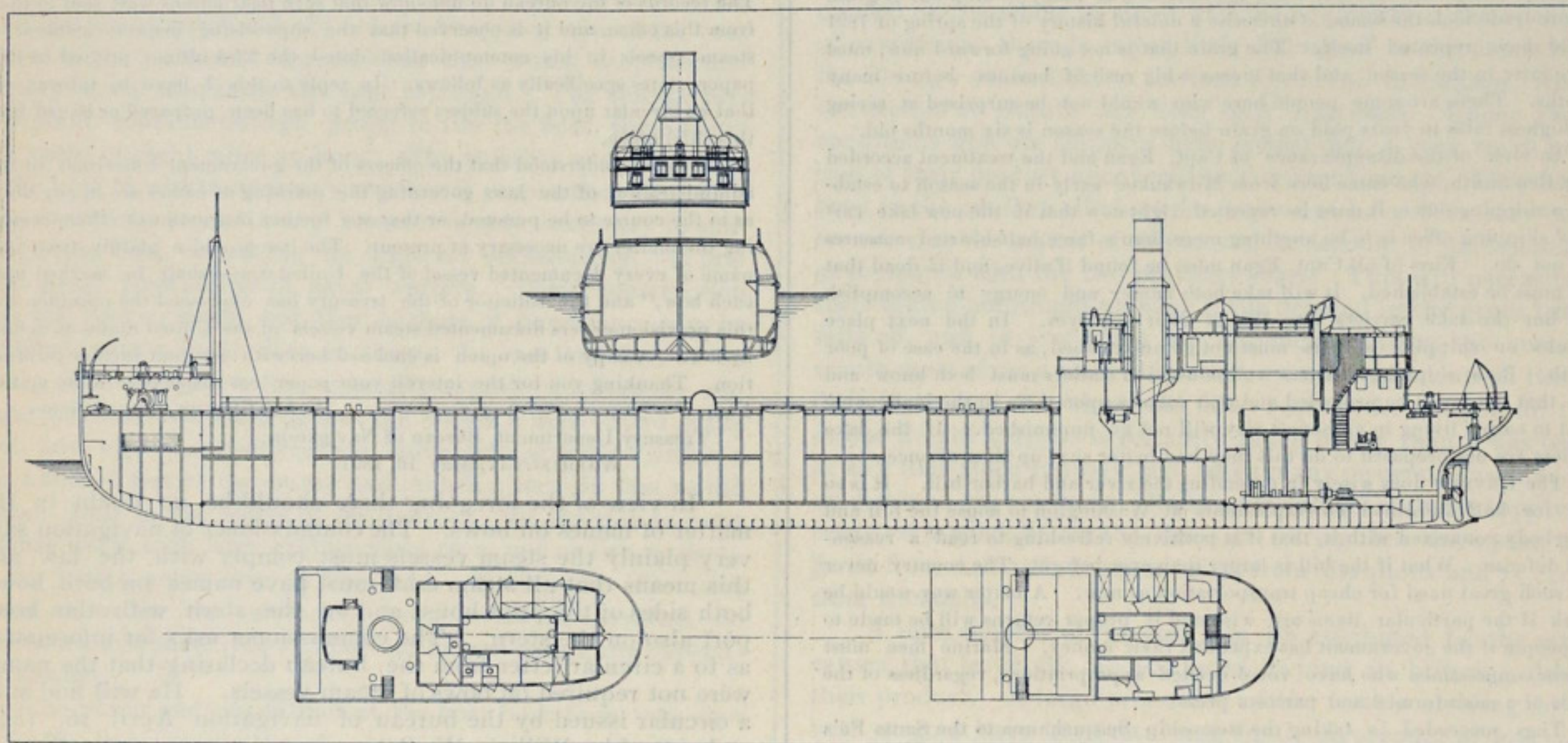
Marked Success With the Monitors.

The first of the monitor type of cargo vessel, the *Andaste*, which has just taken 2,300 gross tons of iron ore from Escanaba on a draft of 14 feet 10 inches forward and 15 feet 2 inches aft, can be pronounced a successful carrier. On this draft, 15 feet even, the *Andaste's* cargo is full 150 tons greater than cargoes carried on the same draft by the *Wawatam* and *Griffin*, boats in the same fleet that are of similar dimensions but of the ordinary type of steel steamers. President Henry D. Coffinberry of the Cleveland Ship Building Company, builders of the monitors, made the trip to Escanaba on the *Andaste* and is very much pleased with the boat.

The accompanying illustration, made from drawings prepared just before the boat was launched, shows the monitor after several important changes in the original design. The second boat of this type, the *Choctaw*, is about ready for launching at the yard of the Cleveland Ship Building Company. The boats dimensions are 266 feet keel, 38 feet beam and 23 feet hold. The triple expansion engines are 17, 29 and 47 inches by 36 inches stroke, getting steam from two 11x12 foot boilers and

furnished. The commissioners failed to comply, were prosecuted criminally and verdict given in favor of the United States. Motion for new trial was made before Judge Sage in the United States district court at Cincinnati, who set aside the verdict and ordered a new trial.

The action of Judge Sage was based on two grounds, one special to the case and the other attacking the constitutionality of that part of the river and harbor act out of which the case arose. It was held that the prosecution was premature because sufficient time had not been given the commissioner to reconstruct the bridge. But the main question, said Judge Sage, and that which goes to the root of the matter, is whether Congress has the power to confer upon the secretary of war the authority admitted to be conferred by the act. The power of the secretary depends upon his having adjudged that the bridge is an obstruction, and his adjudication is made final and conclusive. This is judicial power. The question is one of fact, or a mixed question of law and fact, and it can not be determined by a court without a jury unless the defendant consent. But the question to be decided is whether Congress could delegate, as it has undertaken to do, its authority in the premises to the secretary of war. His conclusion was that it could not. He ordered the



turning an 11½ foot wheel. The water bottom is 4½ feet deep and is emptied and filled by a ballast pump with a 14 inch steam cylinder, 18 inch water cylinder and 12 inch stroke. The steam steering gear can be worked by two wheels, one on the windlass house deck and the other from the pilot house aft.

Against Government Control of Bridges.

Judge Sage of the United States District Court at Cincinnati, who created a little stir among lake vessel owners by his decisions in two or three admiralty cases at Detroit a short time ago, has made a ruling of importance with reference to the clause in the river and harbor act of September, 1890, giving the secretary of war supervision over navigable streams. He attacks the constitutionality of this clause in the act. A state bridge across the Muskingum river had been complained of as an obstruction to navigation. The river and harbor act authorized the secretary of war to investigate the complaint and if he found the obstruction to exist he was further authorized to prescribe the necessary changes, failure to make which subjecting the offending parties to a fine not exceeding \$5,000. The secretary of war heard evidence, decided the bridge an obstruction to navigation and ordered the commissioners of Muskingum county to construct a new span according to plans and specifications

verdict against the defendants to be set aside, and judgment entered that the sections of the river and harbor act upon which the prosecution was based are unconstitutional.

That the case will be carried up there is little doubt. If the final decision should be against this special feature of the act of 1890 it would be very unfortunate for the shipping interests of the country. The Duluth and Chicago bridge cases and hundreds of other cases of a similar nature in different parts of the United States will rest mainly upon the constitutionality of this legislation.

Saucelito is the name given to the wooden steam yacht building at the yard of the Detroit Boat Works for Mark Hopkins of St. Clair, Mich. The boat was launched Saturday and will be ready for service during the yachting season. She is 120 feet long over all, 106 feet keel, 16 feet beam and 8 feet deep. She will be driven at an estimated speed of 16 miles an hour by a triple expansion engine, the cylinders of which are 9¼, 14½ and 24x14 inches stroke. Steam will be furnished by a Roberts boiler 7x8 feet. The *Saucelito* was designed by Mr. Fred A. Ballin of the boat works and will cost about \$25,000.

Official Numbers and Tonnage.

During the week ending Saturday, May 7, the bureau of navigation, E. C. O'Brien, commissioner, assigned official numbers to the following lake vessels: Steam—Essen, Cleveland, 334.76 tons gross, 324.35 net, No. 136,285; Janie E. Smith, Cleveland, 24.06 tons gross, 12.86 net, No. 77,023; Oval Agitator, 94.15 tons gross, 53.39 net, No. 155,225; Monitor, Sandusky, 15.21 tons gross, 9.14 net, No. 91,472.

Herreshoff's Yacht Gloriana.

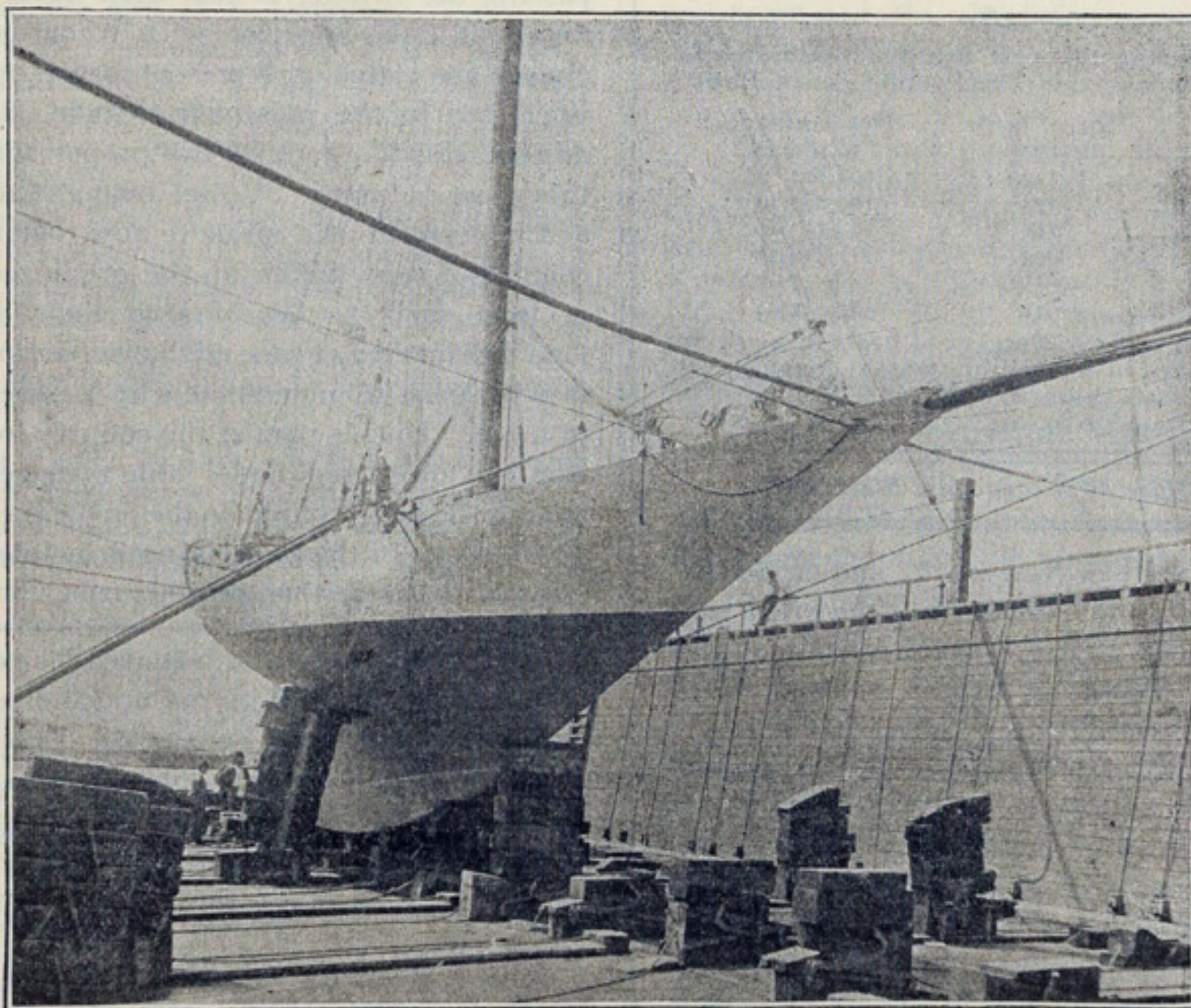
With the aid of the engraving on this page and some data here given an idea of the odd appearance of the famous yacht Gloriana may be secured. We are indebted for the engraving to Forest and Stream, New York, the May 5 issue of which contained an extended description of the boat and her performance. Forest and Stream accords to the Gloriana the distinction of being faster and better than anything near her size now afloat, and adds that apart from her actual merits, she is the distinct embodiment of a principle that is likely to play an important part in the designing of the future. "At the same time," says the article referred to, "there has been more sheer, rank nonsense written about her than has ever before been showered on a winning yacht. Her speed, her performance in rough water, her peculiar features, have all been exaggerated, with the most absurd theories to account for each, until those who have never seen the boat are in doubt whether to accept the whole story in the face of reason and common sense; or to reject entirely as a Yankee hoax the mythical yarn of a yacht with a nose like a

Draft extreme.....	10ft. 6in.
Freeboard, least.....	3ft.
Displacement, long tons.....	34.25
Ballast, lead keel, long tons.....	21.
Ratio of ballast to displacement.....	60 per cent.

DIMENSIONS OF SAIL PLAN.

Mast from fore end of l.w.l.....	14ft.
deck to hounds.....	41ft.
diameter at deck.....	11in.
masthead.....	9ft.
topmast—heel to hounds.....	37ft. 3in.
Bowsprit—cranse iron to end of l.w.l.....	30ft. 6in.
stem.....	18ft. 6in.
gammon iron.....	21ft.
Boom.....	56ft. 6in.
Gaff.....	37ft.
Spinnaker boom.....	44ft.
Topsail yard.....	35ft.
club.....	29ft.
Mainsail.....	2072 sq. ft.
Jib.....	600 sq. ft.
Staysail.....	440 sq. ft.
Working topsail.....	528 sq. ft.
Total.....	3640 sq. ft.

Forest and Stream scoffs at the idea that the Gloriana increases her water-line length as she heels over and consequently



YACHT GLORIANA IN DRY DOCK.

shark, designed by a man who is totally blind, and winning by miles under all conditions from yachts whose high speed is beyond question. After a careful study of the racing of the 46 feet class last season, the impartial yachtsman will come to the conclusion that the Gloriana is the head of the class, under equal conditions of form and handling she will beat the first half dozen of her competitors by minutes and not by hours or miles. Considering the general excellence of the class and the amount of hard racing, this in itself is a position seldom attained by a successful yacht, the season's honors usually being divided among several, or if going to a single winner, being discounted by the fact that most of her rivals are older and inferior in racing construction."

The lines and even the exact dimensions of the Gloriana are the secret of her builders, but the principal dimensions and elements of the design commonly assigned to the boat are as follows:

Length on waterline.....	45ft.
Forward overhang.....	12ft. 3in.
After overhang.....	13ft. 6in.
Length over all, stemhead to taffrail.....	70ft. 9in.
Beam extreme.....	13ft.
L. W. L.....	12ft. 5in.

increases her power to carry sail and her speed. The theory is pronounced so absurd that the only wonder is that it has found any adherents, and yet there are not a few yachtsmen content to accept it as the true explanation of the boat's superiority.

Light Shipments to the Hocking Valley.

In discussing the figures showing iron ore on Lake Erie docks at the opening of navigation, the Iron Trade Review says: "The shipments to furnaces from all lake ports, in the past winter, were 1,971,301 gross tons, an increase of more than 60 per cent. over the record of the preceding winter, which was 1,231,264 gross tons. The shipments from Cleveland, however, show a drop of 11 per cent., those of the winter of 1890-91 being 743,855 gross tons and of last winter 662,098 gross tons. This variation of records would seem to indicate that the large increase was in ores shipped to the Pittsburgh district for steel manufacture. The Mahoning valley, which gets a large part of the ore sent out from Cleveland, and an exclusively iron making region, took about 20 per cent. less the past winter than in the winter of 1890-91. The record is confirmatory evidence of the constantly increasing inroad of steel."

MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

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Published every Thursday at No. 516 Perry-Payne Building, Cleveland, O.

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The books of the United States treasury department contain the names of 3,600 vessels, measuring 1,154,870.38 tons in the lake trade. In classification of this fleet the lakes have more steamboats of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The number of vessels of 1,000 to 2,500 tons on the lakes on June 30, 1891, was 310 and their aggregate gross tonnage 512,787.58; in all other parts of the country the number of this class of vessels was, on the same date, 213 and their gross tonnage 319,750.84. The classification of the entire lake fleet is as follows:

Class.	Number.	Tonnage.
Steam vessels.....	1,592	756,751.53
Sailing vessels.....	1,243	325,131.06
Canal boats.....	703	72,515.42
Barges.....	62	20,472.37
Total.....	3,600	1,154,870.38

Tonnage built on the lakes during the past five years, according to the report of the United States commissioner of navigation, is as follows:

	No. of boats.	Net Tonnage.
1887.....	152	56,488.32
1888.....	222	101,102.87
1889.....	225	107,080.30
1890.....	218	108,515.00
1891.....	204	111,856.45
Total.....	1,021	485,042.94

St. Mary's Falls and Suez canal traffic: Number of boats through St. Mary's Falls canal in 1890, 234 days of navigation, 10,557; tonnage, net registered, 8,454,435. Number of boats through Suez canal during 1890, full year, 3,389; tonnage, net registered, 6,890,014.

Entered at Cleveland Post Office as Second-class Mail Matter.

WHEN the people of the state of New York, and especially New York City, become thoroughly interested in the great project of a ship canal from the lakes to the Atlantic, then may the advocates of this grand work expect an earnest endeavor in its behalf. The promoters of the Detroit deep waterways convention, who accepted the seaboard ship canal as a project secondary for the time being to the twenty-foot channel throughout the lakes, had in view the vast amount of labor that will necessarily be connected with the initial work of securing New York state support for such an important undertaking as the proposed ship canal. They had intended that, on account of the political aspect of the canal question in general in New York, the first steps should be taken in the chamber of commerce of the metropolis. They are now agreeably surprised, however, to find that, as a result of the action of the Detroit convention in inserting a clause in the memorial to congress asking for a survey of the route to the Atlantic, leading journals in New York, and throughout the country in fact, have taken up the question and are urging its consideration with more earnestness than is shown in the Nicaragua canal. The current issue of Bradstreets, date of May 14, devotes several columns to discussion and approval of the favorable report of the House committee on railways and canals on the subject and nearly all of the leading New York dailies have taken a similar course. It is thought that the bill for a survey can be brought up in the House during the coming week, and members of congress who are most enthusiastic on the subject say that they have reason to expect its passage.

AGAIN certain civil engineers around the country, who have gained a moderate degree of prominence in their profession, have failed in an effort to even start a movement of criticism upon the army corps of engineers. Their predecessors managed to at least show a little systematic organization, but Mr. Wisner and his associates got no further than a few articles in print. The criti-

cism, as far as it went, only served to remind the shipping interest of the wide difference between the thorough methods of the engineer corps and the lack of system that characterizes other branches of the general government, notably some parts of the treasury department dealing with the merchant marine. Industries of San Francisco sums up the inwardness of the opposition to the government engineers in the following paragraph: "The late Trans-Mississippi Congress and the Western Waterways Convention of 1891, both endorsed, in a very full manner, the conduct of this department of the government, so it can be seen there are two sides to the discussion and that the criticisms of the army corps, which have appeared in several recent magazine articles, are no more than can be expected in any case where the general government carries on a business that competes or conflicts with private pursuits in any way. Above all in these times of ours, is credit due the corps for the honesty and fairness with which its members disburse millions of public money."

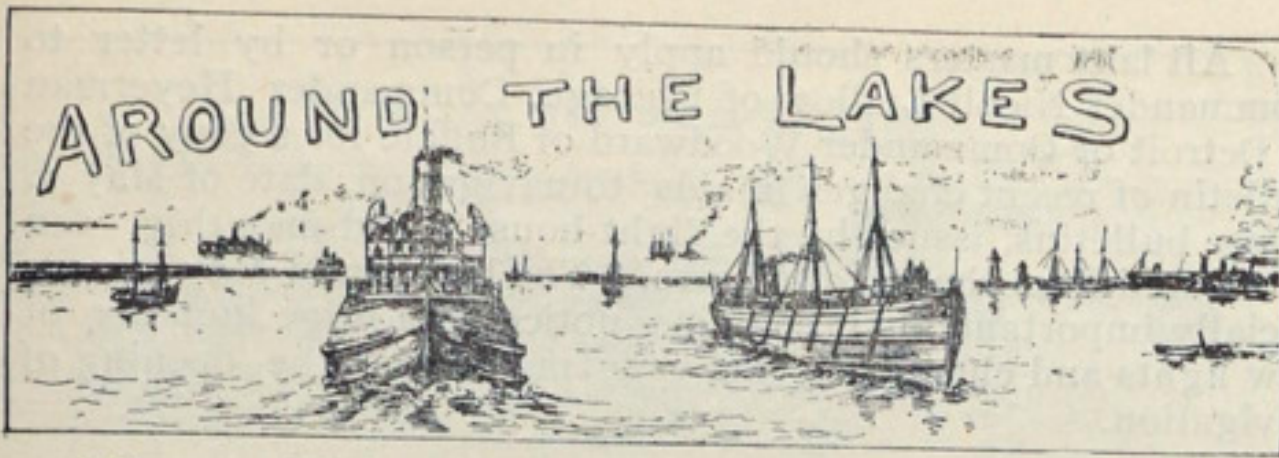
ALTHOUGH there is no possibility of a bill for free iron ore passing the Senate, it has been agreed that the iron ore producers of Lake Superior, with whom lake vessel owners are so closely associated, will present formal opposition to such a measure, even in the present free trade House. To do otherwise might indicate a lack of the proper spirit among supporters of this great industry. Vessel owners should join in this protest, and in event of the measure now before the ways and means committee being taken up the organized vessel interests should at least send to Washington their disapproval of the bill. It is difficult for anyone with even an ordinary knowledge of the iron business to understand why Massachusetts should want free iron ore. In this part of the country, where the manufacture of iron has prospered under able management, the importance of having the fuel brought to the ore or the ore to the fuel, is recognized as one of the underlying principles of the business. Massachusetts has neither ore nor coal.

No river and harbor bill need be expected at the next session of Congress. In giving notice of a day for consideration of the present bill in the Senate Mr. Frye said: "I am authorized by the committee on commerce to say that this is a bill for two years, and that none will be reported from that committee at the next session of the present Congress."

A Risk on Anything.

Lake vessel owners who have of late years taken up close relations with the underwriters of England's famous Lloyds will be interested in the following from Fairplay of London: "There is no conceivable risk that can not be covered at Lloyds. A year or two ago a line was placed in the room on behalf of a banker's clerk to cover that gentleman against the loss he would sustain if his wife should present him with twins. A framed wager policy hangs on the wall in one of the rooms at Lloyd's insuring persons against Napoleon Bonaparte ceasing to exist or being taken prisoner before June 21, 1813; the policy is dated May 21, 1813, and the premium charged was 3 guineas per cent. The latest curiosity in the fancy insurance line is a large policy covering the risk of the famous racehorse Orme failing from any cause whatever to run for the Derby."

An Ashland dispatch says: "The Coon expedition starts from Ashland for Lake Huron shortly to search for the sunken steamer Pewabic, which will be raised if possible. Almost simultaneously another expedition will be sent from Duluth, and that there will be a clash of interests is certain. Coon has fitted out the steamer Emerald at Ashland, and will have three divers accompany him, headed by a Boston expert. He is backed by Ashland capital, Mayor Durfee and F. Prentice having the controlling interest. The Duluth expedition is sent out by Minneapolis capital. Coon supervised the Emerald expedition last year when Diver Pelkey lost his life while working at the wreck.



Messrs. Mackay Sons of Hamilton have purchased the steamer Acadia from Capt. S. Malcolmson for \$20,000, to take the place of the lost Celtic.

Commander Ludlow gives notice that the steam fog-signal at the South Manitou, Lake Michigan, has been repaired and will be used in thick or foggy weather.

The legislative committee of the Lake Carriers' Association met at Buffalo Monday afternoon and organized by electing Peter P. Miller chairman. Some routine business was transacted.

Capt. J. J. Ibbotson, aged fifty-eight years, died May 7 in Detroit. For forty years he sailed on the lakes. His commands were the schooners Sophia Smith, Jane Bell, Columbia, A. Boody, Glad Tidings, Bermuda and D. P. Dobbins.

The Senate committee on commerce has cut about \$2,000,000 from the river and harbor bill. All works coming under the contract system suffer a uniform reduction of 25 per cent. This cuts the first appropriation for the 20-foot channel on the lakes from \$500,000 to \$375,000.

The steel steamer Samuel Mitchell, built by the Globe Iron Works Company for Samuel Mitchell of Negaunee and some of the stockholders of the Cleveland Rolling Mill Company, was given a trial trip Wednesday. The Mitchell will be sailed by Capt. Thomas Wilford, who is at the head of the Cleveland Rolling Mill Company's fleet. She is one of the finest steel boats on the lakes.

It is understood that Capt. McDougall and other stockholders in the American Steel Barge Company have a half interest with R. L. Henry and others of Chicago, who have secured the contract for carrying passengers by lake to and from the exposition grounds. A whaleback passenger boat will be used in the service and it is on this account mainly that the managers of the barge company are interested. They want to have a whaleback at the fair.

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company.....	\$100 00	\$.....	\$ 75 00
Champion Iron Company.....	25 00	.....	62 00
Chandler Iron Company.....	25 00	.....	45 00
Jackson Iron Company.....	25 00	.....	100 00
Lake Superior Iron Company.....	25 00	44 00	47 00
Minnesota Iron Company.....	100 00	.....	75 00
Pittsburgh & Lake Angeline Iron Co.....	25 00	.....	150 00
Republic Iron Company.....	25 00	.....	21 00
Ashland	25 00	.....	.....
Section Thirty-three.....	25 00	.....	7 00
Brotherton.....	25 00	.....	2 50
Iron Belt.....	25 00	2 15	2 25

Although money is very plentiful in all parts of the country the investment market is generally depressed and dullness in mining shares is especially noticeable. The number of transfers in Lake Superior iron stocks during the past month is so small as to leave the market in a very discouraging condition. With values exceedingly low, sellers and buyers are still apart on prices and only in the case of Chandler has there been any inquiry during the past week. Even with this stock buyers are offering but about \$42 while the owners of it are holding for about \$45. An assurance of dividends is the cause of strength in Chandler, as shown by the decline in values of other shares where dividends were expected. Holders of Cleveland-Cliffs stock manifest a discouraged feeling and the shares of the company are lower on account of failure on the part of the management to pay the dividend expected in April. The delay is attributed to a desire on the part of the company to be well fortified under an unsatisfactory iron market, but this does not help the stock among outsiders. The Lake Superior company will

hold its annual meeting in Boston, June 15, when it is expected the management will be authorized to sell or lease certain lands not desirable for mining purposes. This with the election of directors will probably be all that will be done at the meeting, as all matters pertaining to the capital, which is now 100,000 shares with 84,000 shares issued and the remainder treasury stock, have been settled.

Ferdinand Schlesinger is reported to have said in a recent interview that the mining companies in which he is interested have sold about 500,000 tons and will produce 1,000,000 tons this year. The bulk of this ore will, of course, come from the mines of the Buffalo company at Negaunee. Mr. Schlesinger denies the statement that the supply of ore at the South Buffalo has given out. He says the South Buffalo shaft was abandoned because the ore was closer to the shafts of the Queen and Prince of Wales than it was to that of the South Buffalo.

At the annual meeting of the East New York Iron Company in Ishpeming, last week, officers were elected as follows: S. K. Wambold, president; W. H. Johnston, vice president; J. Parke Channing, treasurer; S. K. Wambold, M. J. Luther, F. A. Ely, J. H. Whorton, W. H. Johnston, W. C. Runyon, R. J. Williams, A. J. Rich and J. Parke Channing, directors. The resignation of Mr. Channing as superintendent was accepted. An assessment of 25 cents per share on the capital stock of the company will be called.

Here are some quotations from Chicago on Mesaba range stocks: Biwabik, \$33 per share; Buckeye, \$30; Cincinnati, \$5; Champion, \$10; Cosmopolitan, \$20; Columbus, \$7.50; Clark, \$10; Great Northern, \$11.50; Great Northern I. & S. Co., \$1.35; Keystone, \$10.50; Kanawha, \$15; Licking, \$7.50; Lincoln, \$10; Lake Superior, \$4.50; Little Mesaba, \$11.50; Mallman, \$1.35; Mountain Iron, \$55; Mesaba Mt., \$18; Minneapolis, \$10; Shaw, \$9; Washington, \$10.

Valuable Information Regarding Canadian Canals

Interest among lake vessel owners and shipbuilders in the Welland and St. Lawrence canals increases with every move of advancement toward the proposed 14-foot navigation throughout the Canadian canal system, and within the past year especially there has been an unusual amount of inquiry regarding progress in the work and dimensions of the canal locks in their present state. Much of this inquiry has been from owners and builders interested in sending vessels to the coast. On this account, the report of John Haggart, minister of railways and canals for the fiscal year ending June 30, 1891, which has just been issued from Ottawa, proves very interesting. The report contains a number of maps of the district covered by the canals and complete details on present dimensions of all the canals and locks, as well as a vast amount of other information pertaining to distances tolls, etc.

Of Canada's new Sault Ste. Marie canal the report says that the changes sanctioned by Parliament at its last session have made it necessary to increase the time for executing the work, and an extension to May 10, 1893, has been granted to the contractors having in charge the main work, which embraces the excavation for the lock pit and the prism of the canal, the masonry for the lock and also for a guard gate above the lock and the construction of side walls, puddle trenches, etc. As a result of the action of parliament in December last, the report gives the following as dimensions of the lock chamber adopted by order in council: Length of chamber, 900 feet; width of chamber, 60 feet; gate width, 60 feet; depth of water on the sills, 19 feet at the lowest recorded water level. This depth, though calculated on a different basis (extreme low instead of 'mean' water level), is intended to be the equivalent of the depth, 21 feet, of the new American lock now under construction. By the scheme as so modified accommodation will be afforded to three vessels lying in the lock one behind the other, one of the lake type 320 feet long, and two of the Welland canal type 255 feet long, with ready means of entrance and exit on a course through the gates and lock straight with the line of the canal. The canal proper will have a width at low water level of 152 feet, and a bottom width of 145 feet. The depth will be made suitable to navigation at mean water level by vessels drawing 20 feet. The gates will be worked either by hydraulic power or by electricity.

In General.

W. W. Bates, ex-commissioner of navigation, is writing a book on the shipping question.

President Harrison has appointed John Birmingham of California to be supervising inspector of steam vessels for the First district, to succeed Henry S. Lubbock, resigned.

Arthur Sewall & Co., Bath Shipbuilders, who have built many big wooden vessels, are about to establish a steel ship-building plant. A sailing ship of steel will be the first to be constructed. The boat will also be the first steel sailing vessel constructed in this country. Iron and steel barges have been constructed here but no steel sailing ships.

Lake vessel owners who have had dealings with English underwriters through New York brokers will be interested in the announcement that the firm of Wreaks & Loines, through whom some of this business was placed, has been dissolved. Mr. Stephen Loines enters, as a partner, the firm of Johnson & Higgins of New York, who have been engaged in the same line of work.

The Industrial Journal of Bangor, Me., says: "Parties from out of the state are said to be considering the project for establishing a plant for building whalebacks at Wiscasset. If the demands of salt-water commerce call for whalebacks, why Maine can build them as well as we can clipper ships, and at Wiscasset there is no finer location for a shipbuilding plant in the whole world."

At the convention of seamen held recently in Chicago resolutions were adopted protesting against the employment of Canadians on American lake vessels, and Congress was asked to pass the bill from the Pacific coast union known as an "act to amend the laws relating to shipping commissioners, seamen and owners of vessels." Copies of the Chicago resolutions have been sent to representatives and senators in Washington, but it is not probable that the Pacific coast bill or any other measure of its kind will pass unless some very active work is done by the unions in Congress.

London Iron says that a novel submarine boat, the outcome of the ingenuity of an Italian engineer, Signor Pietro degli Abbati, has just been launched at Savona. It has been built for piscatorial purposes and for recovering articles of value lost in the depths of the sea. The vessel is constructed of steel, in an ovoidal form, and is propelled by a screw actuated by an electric motor. It is 28 feet 4 inches long, 11 feet 8 inches deep, and 8 feet 4 inches wide, and it is to be capable of remaining six hours under water at a depth of 330 feet. Electricity, in addition to furnishing the motive power, will, of course, be the illuminating agent.

If the report be true, the light-house board has not been officially informed that Capt. Anderson, the contractor for building Diamond shoal light, has abandoned the work. When this is done it is believed that the board will recommend the government to undertake the work. Then, if Congress will pass the necessary appropriation, we are confident that we can guarantee to our marine friends a lighthouse on this dangerous reef. A member of the engineer corps drew up the original plan, and with the government to foot the bills, there is no reason why the structure should not be built.—Marine Journal.

Notices to Mariners.

Light-house Inspector Heyerman of Detroit gives notice that the fog bell at Grand Marais, Minn., is disabled and can not be sounded until repaired. Repairs will be made as soon as soon as possible.

The Dominion also gives notice that a nautical mile of 6,077 feet has been measured and marked out near the southeast shore of Owen Sound, $5\frac{1}{4}$ miles from the town for the purpose of testing the speed of steam vessels. Each end of the mile is indicated by a pair of beacons painted white, with the letters "M M" on them in black.

The Canadian department of marine gives notice that the light maintained by the harbor commissioners of the town of Port Hope, on the north shore of Lake Ontario, is now fixed white instead of a fixed red and white, as described on admiralty charts No. 797 and 1152, and in Canadian list of lights No. 179. The light is fixed white, consisting of two gas jets in an open lantern at a height of 40 feet above the level of the lake and should be visible 4 miles from all points seaward.

All lake masters should apply in person or by letter to Commander Nicoll Ludlow of Chicago, Commander Heyerman of Detroit or Commander Woodward of Buffalo for a copy of the bulletin of recent changes in aids to navigation, date of May 1. These bulletins, issued by the light-house board monthly, can be secured from the naval officers. The bulletin of May 1 is especially important, as it contains notice of a large number of new lights and changes in buoyage made with the opening of navigation.

Operations in the Saginaw Lumber District.

A Saginaw correspondent to the Northwestern Lumberman says: "People who have predicted that the Saginaw river as a lumber manufacturing point was on its last legs, so to speak, may have reason to revise their opinions. The prediction has been made repeatedly that ten years hence the output would exceed 300,000,000 feet, and it is confidently believed by the writer that these figures are very conservative. Within the past year arrangements have been perfected whereby a vast quantity of timber, not tributary to the Saginaw river, is to be brought here to be manufactured. Already deals have been made that will transfer 3,000,000,000 feet of Canadian timber to this river to be manufactured, a supply equal to a cut of 500,000,000 feet for six years. There is yet a stock of from 300,000,000 to 500,000,000 feet annually for five years in northern Michigan that will come here by water and rail, exclusive of a deal just made by the Michigan Central Railroad Company with David Ward, to transfer from his timber lands in Otsego, Crawford, Kalkaska and Antrim counties, about 1,200,000,000 feet of logs to the Saginaw river. Of course this contract will cover a number of years in filling, and it will add largely to the quota of stock already booked for this lumber manufacturing mart."

Ready to Make Marine Tubular Boilers.

The Babcock and Wilcox Company of New York and Glasgow, manufacturers of water tube steam boilers, after having experimented for the past twelve years on various arrangements of its steam boiler applied to marine service, has finally decided on an arrangement of this boiler for marine work, and has had several of them working satisfactorily for some time in and about New York. The boiler designed by the Babcock and Wilcox Company, as compared with the ordinary marine and Scotch boiler, occupies much less space for a given horse power and weighs (with water) less than one-half, besides being absolutely safe from explosion, on account of the arrangement of circulation of water. Every square inch of the boiler is accessible for cleaning, which is a fact to be appreciated in boilers in marine service. The Cleveland office of the Babcock and Wilcox Company, which is located in the Perry-Payne Building, states through its manager, P. B. Huyette, that the company will be glad to furnish full information, detail drawings, prices, etc., on application.

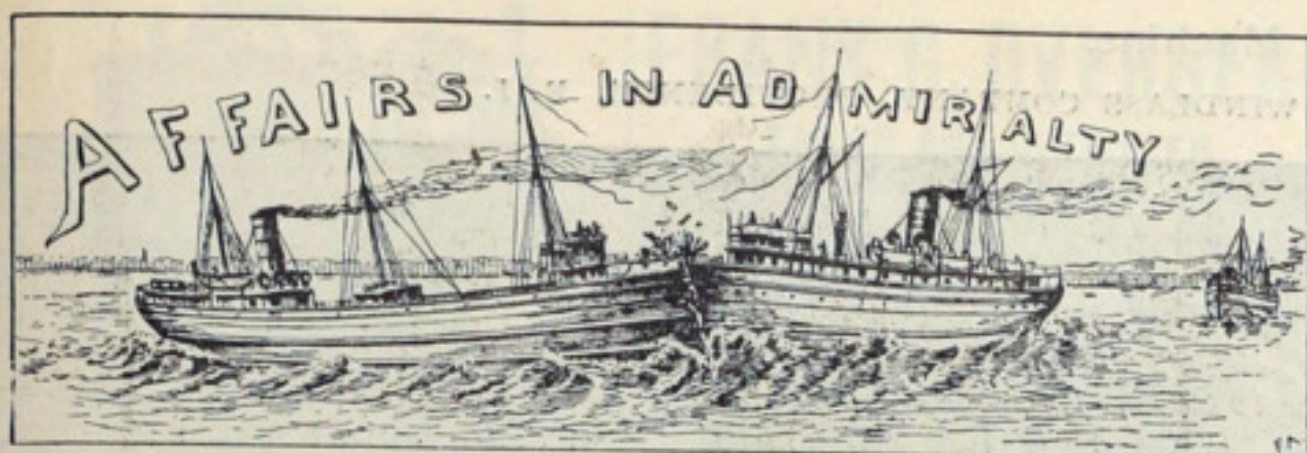
The Freight Line to the Northwest.

Shippers of freight to the northwest cannot afford to ship during open navigation without getting rates from the Northern Steamship Company, whose Cleveland office and dock is at 43 to 61 River street. This refers to general freight in appreciable quantities, but is more especially true of shippers of manufactured iron and heavy machinery. The saving of time through shipping this way would be prestige enough even if there was no saving in freights. Their fleet of six boats run direct from Buffalo and Cleveland to Duluth, connecting there with the Great Northern Railway Line, without stop.

Another Big Dry Dock.

A letter from Mr. W. I. Babcock, manager of the Chicago Ship Building Company, refers to the reorganization of that company as detailed in the REVIEW last week, and adds that the company will doubtless construct at once a dry dock, capable of taking in the largest vessels on the lakes. A dock of this kind is much needed in Chicago. It will, of course, be located on the property of the Chicago company at Colehour.

Elevators at Duluth and Superior shipped 3,744,146 bushels of wheat during the week ending May 14. This grain was taken down the lakes in seventy-three vessels and there was not the slightest complaint of delay at either end of the route. Shipments of the season from the head of Lake Superior to the same date (24 days of navigation) foot up about 8,000,000 bushels.



Pittmans & Dean of Detroit libeled the steamer Samuel Marshall some time ago for a fuel bill contracted by the J. E. Potts Salt and Lumber Company, which company, when its failure was announced, had the Marshall under charter. The case was heard before Judge Severns, in the United States district court for the eastern district of Michigan. In summing up the case the court said: "The owner of a steamship having chartered her to a company which was a resident of the same town as libellant, the charter expressly stipulating against the creation of any liens on the vessel, and the circumstances indicating that the libellant furnished coal to the vessel, knowing that she was under charter, and on the credit of the charterers, who subsequently failed, it is held that no lien attached to the vessel, either under the general maritime law or the statute law of Michigan. The libel in this case, which claimed a lien under the general maritime law, may be amended so as to assert a lien under the law of the state."

When masters are compelled to throw over a portion of their cargo in time of accident it is always well to be prepared in case of legal action afterward with evidence regarding that portion of the cargo so discharged. A case heard before Judge Simonton of the United States district court of South Carolina, was that of a vessel which had been in a collision, sprung a leak and thereafter jettisoned some of her spare furniture as well as part of the cargo. On an adjustment in general averages, a certain sum was charged against the cargo, and the owners thereof objected that the jettison was unnecessary. Suit was brought to recover the amount charged against the cargo in the adjustment, and the evidence indicated that there was great exaggeration, both in alleged condition of the vessel after the accident and in the number and value of the articles jettisoned. The court held that the libellant must make out his case by a preponderance of evidence, and in view of the exaggeration given by the evidence, such articles as were not clearly proven to have been jettisoned should be excluded from the general average adjustment, the others being allowed.

Trade Notes.

W. D. Randall & Son, Cleveland, have finished the mattresses and pillows for the Cleveland Ship Building Company's Nos. 14 and 16, and have the contract for No. 17.

The steam towing machine invented by Shaw & Spiegel and manufactured by the American Ship Windlass Company of Providence, R. I., is especially adapted to relieve the strains on wire hawsers when used in towing, and has been proved in practical use by long service.

The Baker sub-marine boat illustrated in this issue has a Rumsey water bottom pump and a World injector.

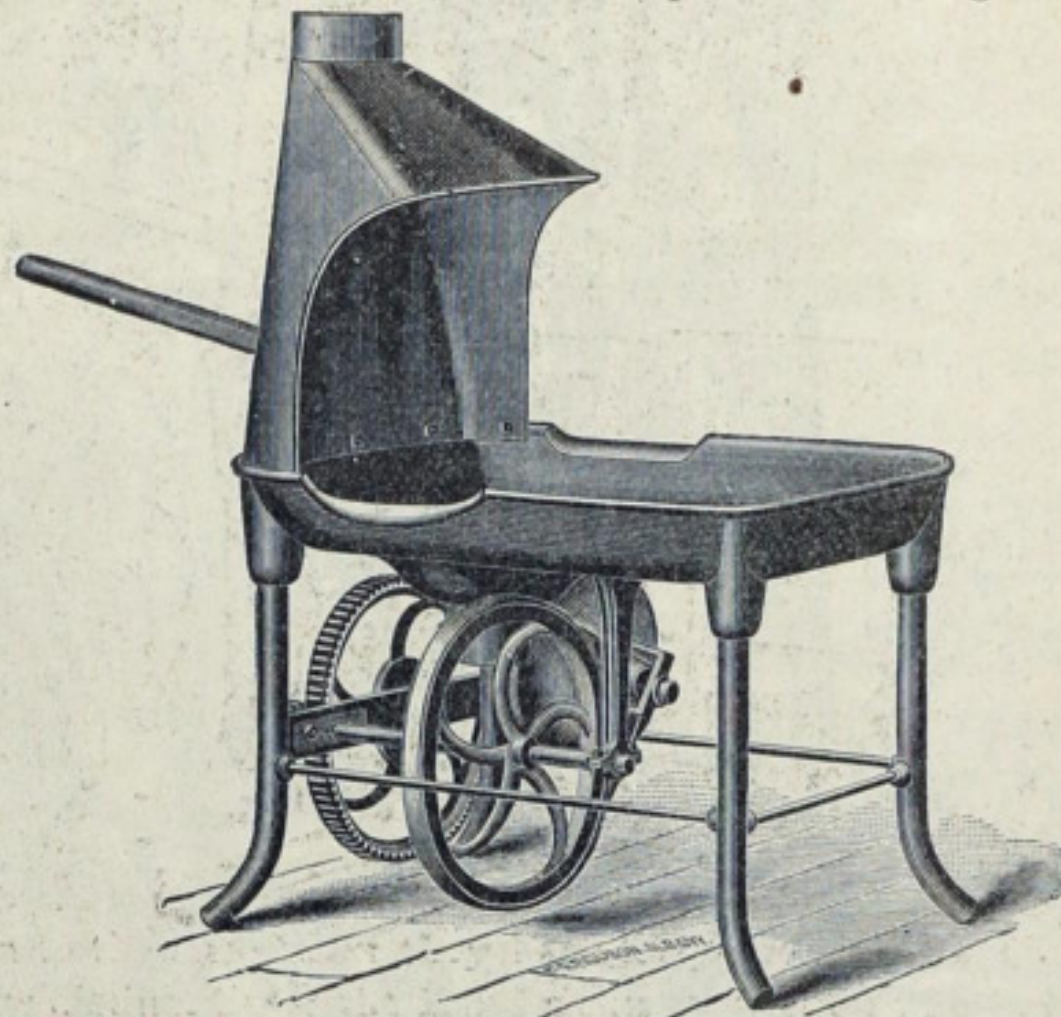
Modern Marine Engines.

The quadruple expansion engine practically designed itself as the placing of two cylinders above the existing two of an ordinary compound engine made the quartette, and it was only a question of detail in arranging the sizes of the cylinders, etc., to get the best possible results; but there still exists the difficulty of sizes of cylinders for very large powers, so that when this has to be faced it will be found that the claims of the advocates of the quadruple for saving of space will exist no longer. For larger powers than are now required, the obvious arrangement would be three low-pressure cylinders with a high pressure over the center one, and a medium-pressure over each of the other two; or, for quadruple expansion engines, one high pressure and the usual two intermediate, each over one of the low pressures.—A. E. SEATON, naval architect.

Send 20 cents in stamps for Tabulated Statement showing Lake Superior ore production for 1891, and the past 36 years.

Portable Forges.

Purchasing agents of lake engine building concerns and shipyards, and superintendents of machine shops will find it worth their while to look twice at the illustration below. It represents one of the most popular portable forges in shop use. It is manufactured by the Empire Portable Forge Company, Lansingburgh, N. Y., whose productions in this line have been on the market longer than those of any other company. As a result of this they are found in shops all over the globe. In



addition to the one shown they have forty-six varieties, divided into four distinct lines; the Empire run by friction wheels without belts; the special Western, making use of belts but heavily and strongly built; the regular Western, which meets all competition, and the Universal forge, in which all gear is discarded and the blower is operated by chain and sprocket wheel. These latter are especially adapted for lake ship yards, engine building concerns and shops, and can be had from the company's agents or from the company direct.

The passenger steamer Nyack will run this season independent of any other passenger line between Cleveland and Duluth, calling at Detroit, Port Huron and Lake Superior ports, making the round trip, 1,600 miles, in ten days. The cost of the trip is \$40, including meals and stateroom berth. Sailing dates are June 6 and 20, July 4 and 18, August 1, 15 and 29, September 12 and 26. For further information write or inquire of C. H. Tucker, No. 57 River street, Cleveland.

Northern Steamship Co.

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Finest Equipped Fleet on the Lakes. A-1 in Every Particular.

Northern Light, Northern King, North Wind,
Northern Wave, Northern Queen, North Star.

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C. H. TUCKER, Gen'l Agt.

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MANUFACTURERS OF

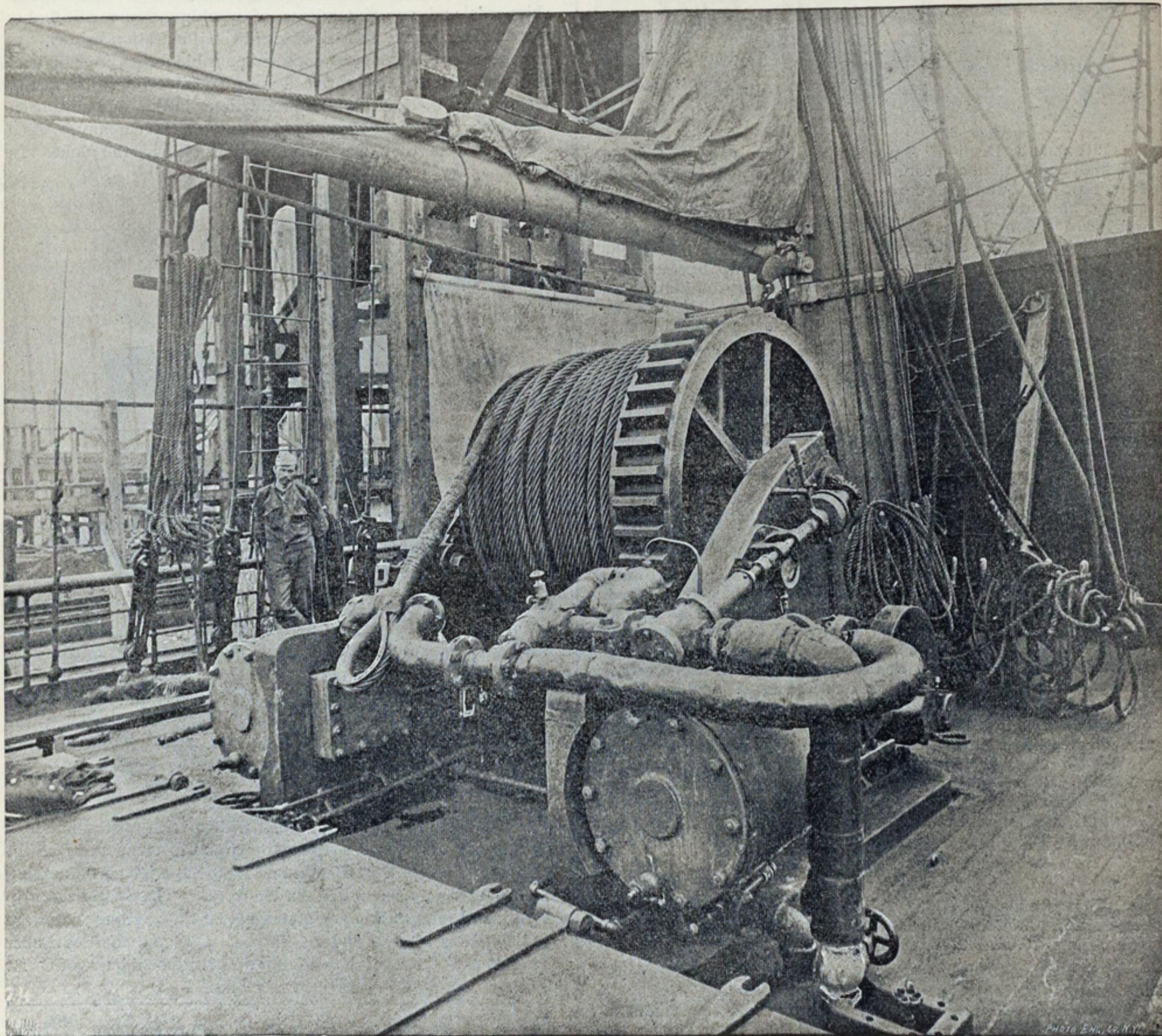


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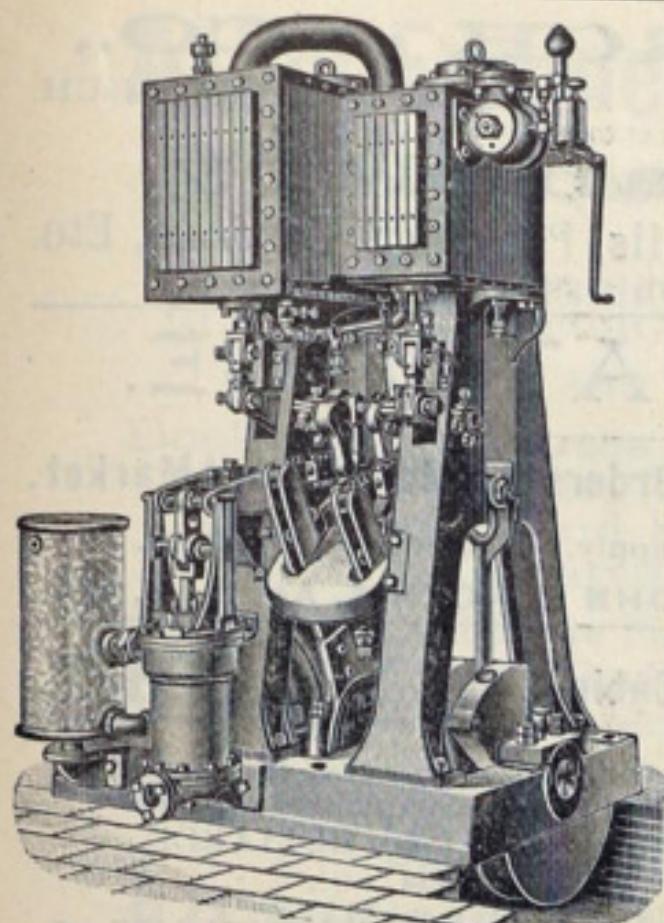


Owing to the information that a machine similar to the one illustrated above will very probably be placed on a steamer of one of the large Cleveland fleets, it is thought worth while to reproduce the same. The machine was invented by T. Jackson Shaw and John M. Spiegle and has been in use on the steam collier Orion, owned by the Boston Towboat Company, for three years and in that time, the president of the company says, the machine has paid for itself in saving hawsers. The principle of the machine is that the resistance of the towing barge is borne entirely by the steam pressure in the cylinders. The wire hawser is wound on a drum, which is driven directly by a pinion gear on a crankshaft of the engines. The machine is fitted with a reducing valve, which enlarges the opening of the valve or decreases the opening according as the strain increases or decreases. The action of the machine is as follows: In a sea-way, or when the vessel pays off, increasing the strain on the hawser, the drum begins to revolve so as to pay out the hawser, and this action opens the reducing valve and increases the pressure in the cylinders, and continues to do this until the pressure is adequate

to hold the strain on the hawser; then if the strain decreases on the hawser, the pressure in the cylinders revolves the drum and winds the hawser in. In this way the machine is prevented from paying out the whole of the hawser, and only enough to relieve the strain on the hawser to prevent its breaking. By this arrangement the hawser is at all times relieved from any sudden strain, and the elasticity of the steam furnishes a cushion for the pistons, so that it completely protects the hawser, and gives an elasticity without which the hawser would be disabled in a short time. When the tow barge casts off the hawser, the reducing valve is disconnected, and the machine is a simple hoisting drum, and can be started to wind up the hawser.

The new monitors, Andaste and Choctaw, are equipped with the Lucigen lights, furnished by the Industrial Light Company, New York.

The editor of the **MARINE REVIEW** has examined Patterson's Nautical Dictionary thoroughly, and with pleasure recommends it to any one having any connection with marine affairs.



COMPOUND ENGINES.

8 x 14 x 12	14 x 24 x 20
9 x 16 x 16	15 x 28 x 24
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Side Valves with Radial Valve Motion.

VULCAN IRON WORKS, CHICAGO.

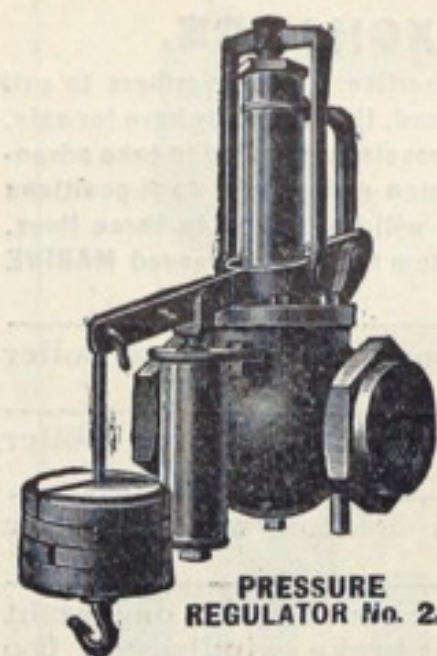
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Special Size with Hook and Block Combined for Yachts.

"Your self-detaching Davit Fall Hook I have in use on steamers of the Mutual and Orient lines. and from reports made by masters I can safely recommend the hooks. The captains cannot say too much in their praise."

Signed, GEO. P. MCKAY, Gen. Mgr.

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Try our ANTI-FRICTION GRAPHITED LUBRICANTS, for all classes of machinery.

Try our PIPE CEMENT for Caskets and Packing Pipe and Valve Joints.

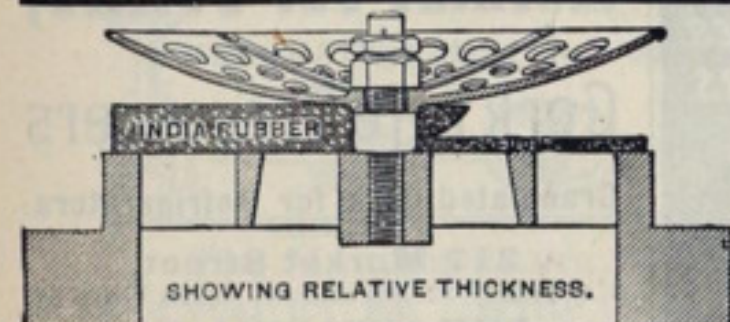
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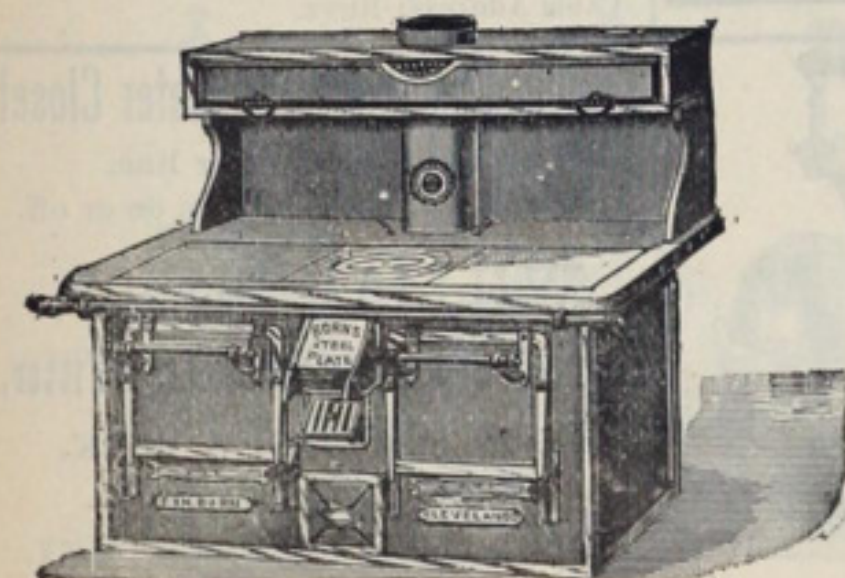
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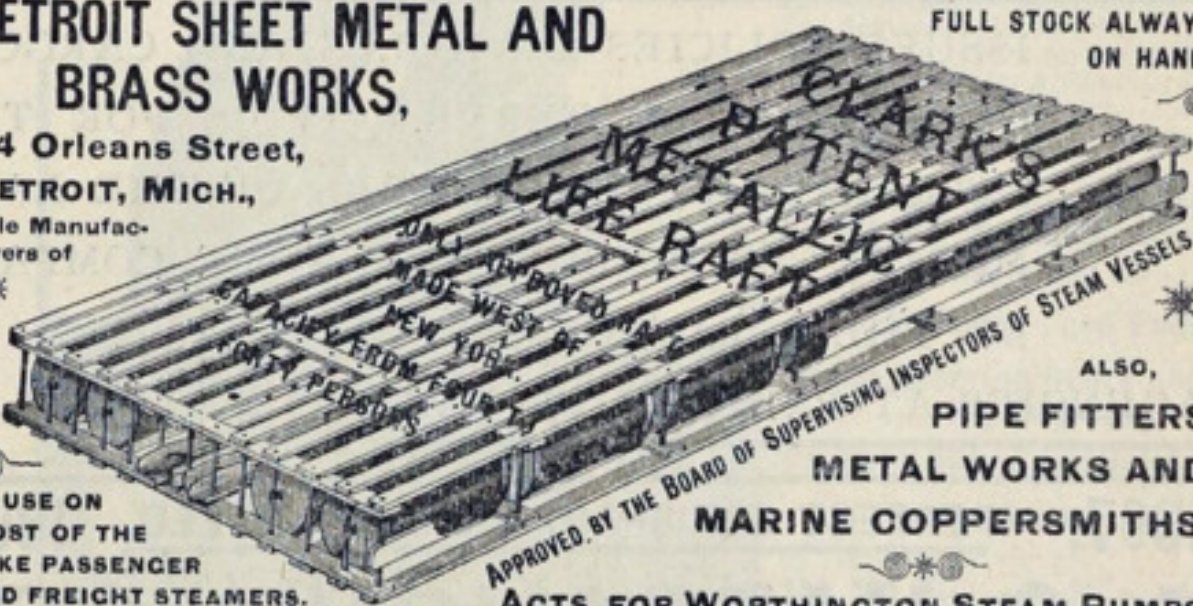
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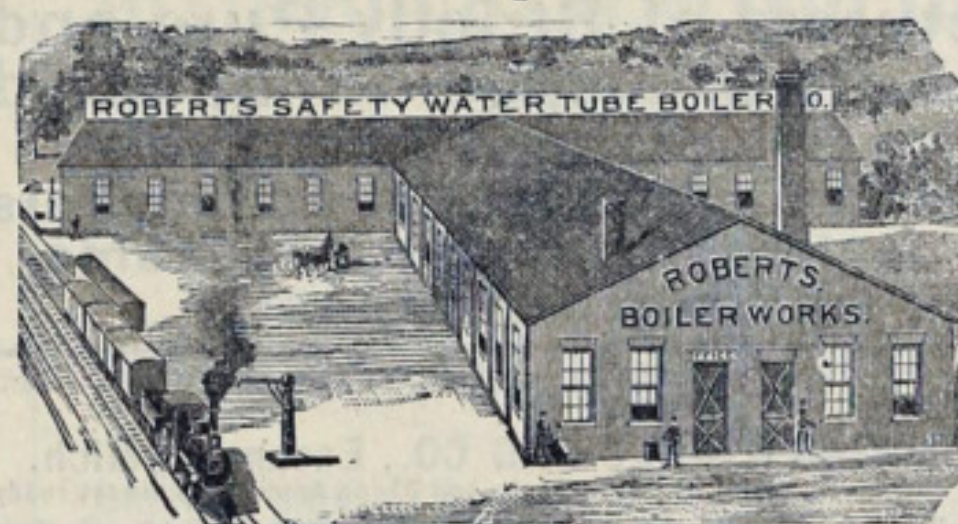
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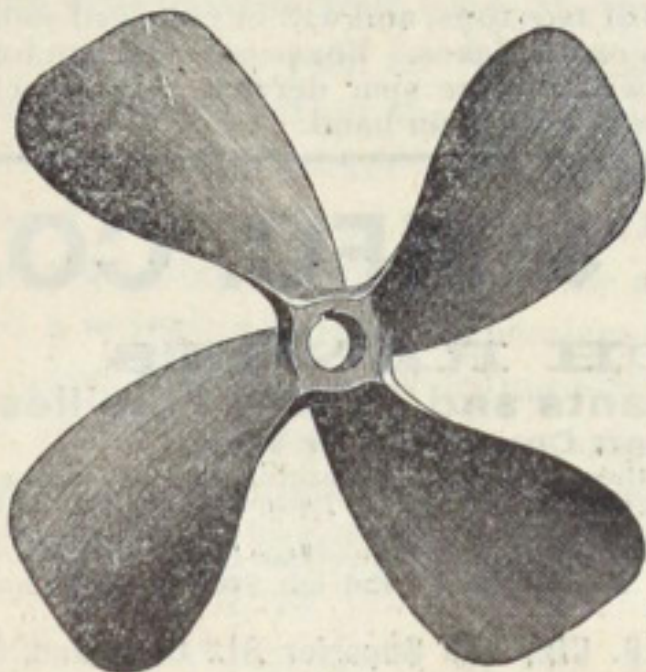
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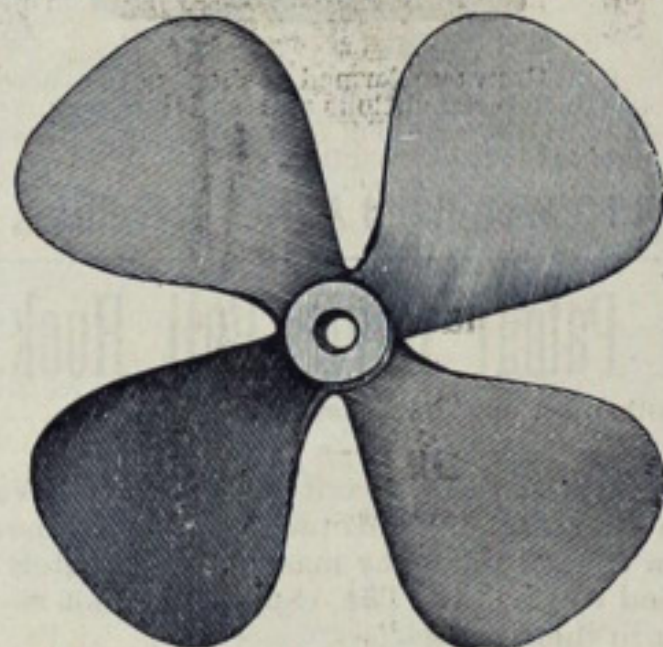
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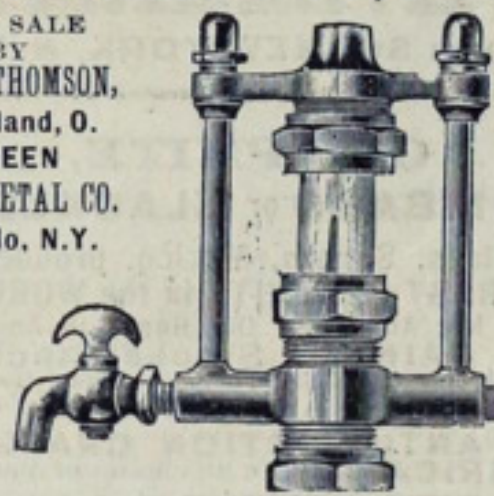


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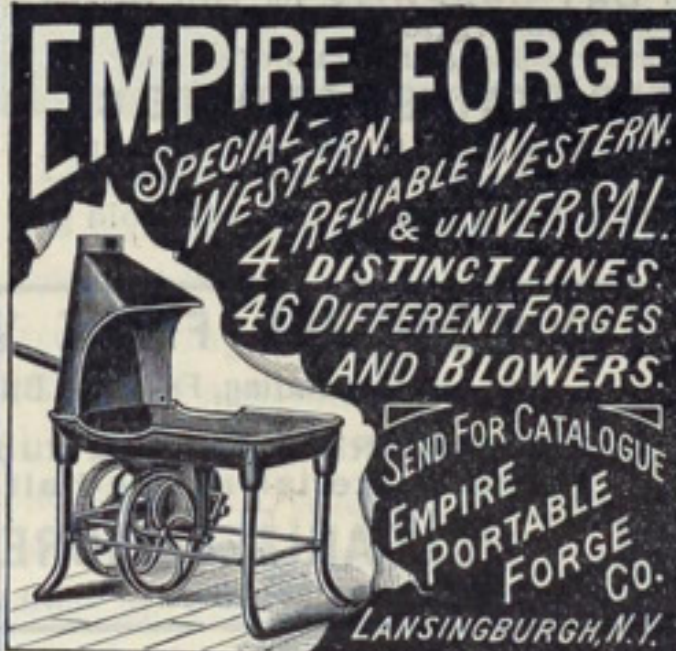
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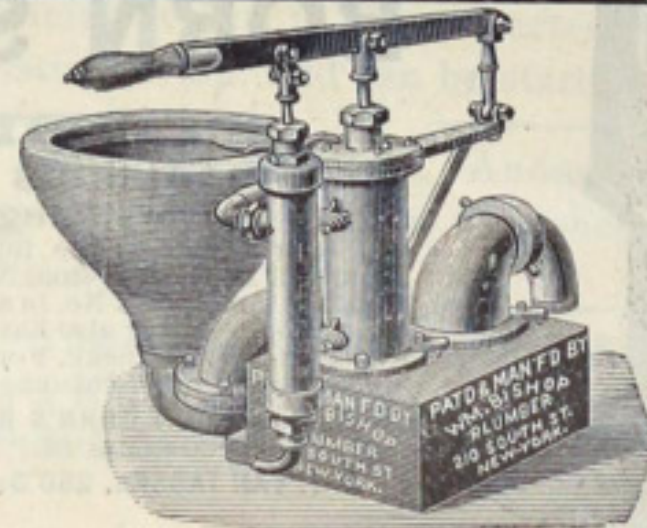
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
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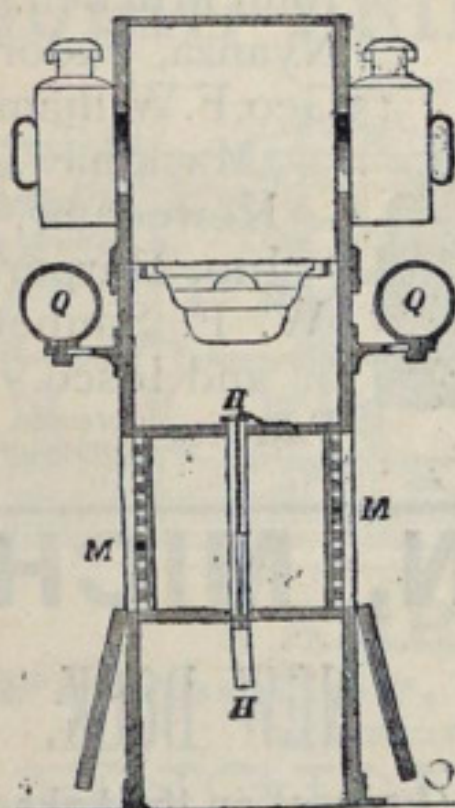
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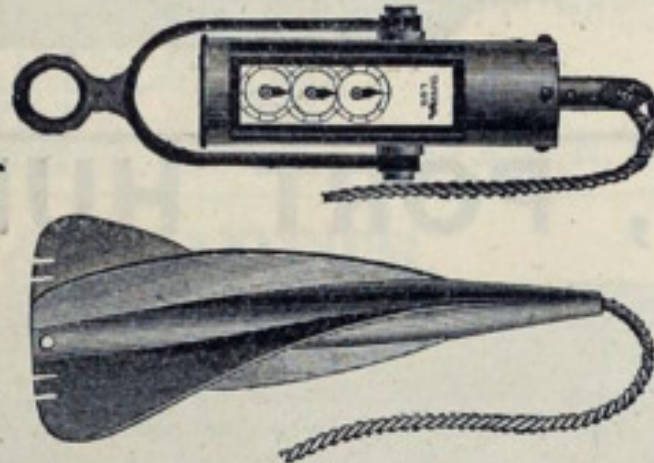
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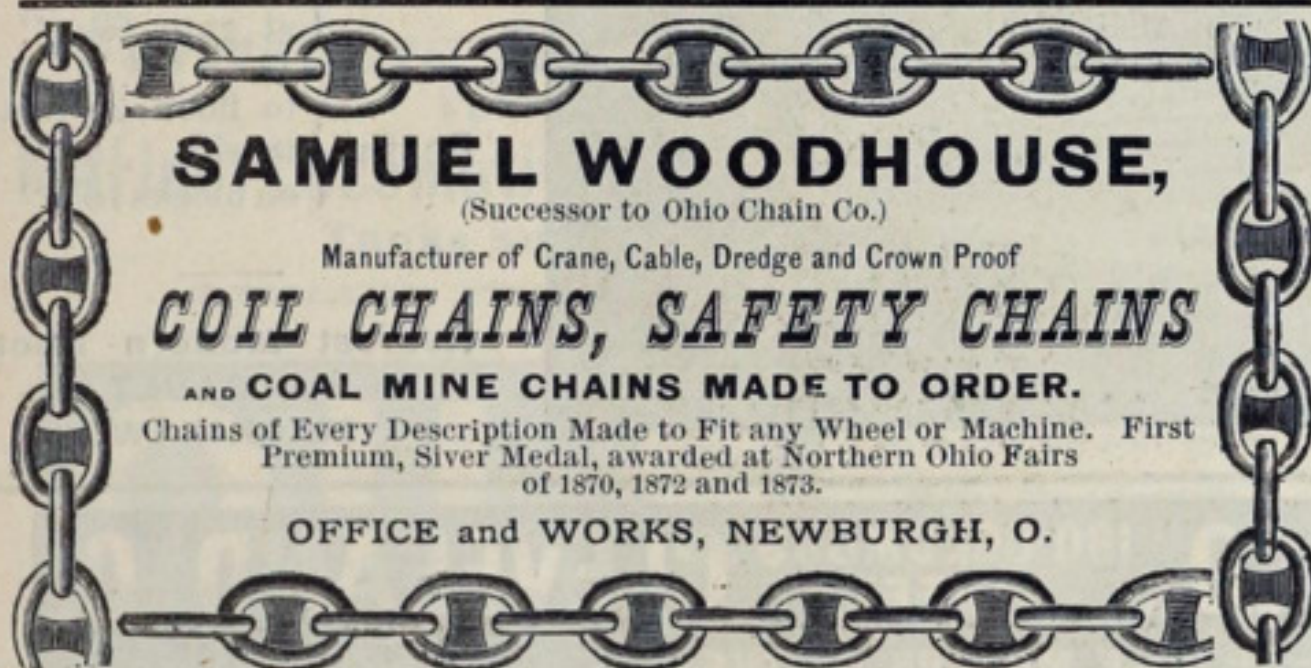


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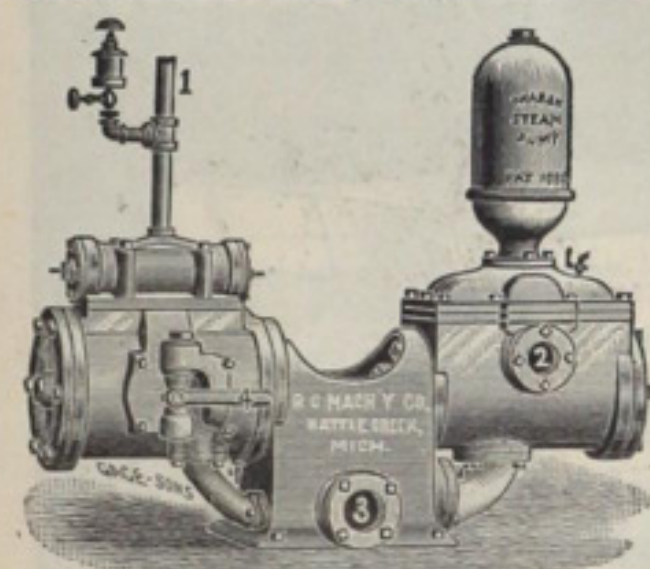


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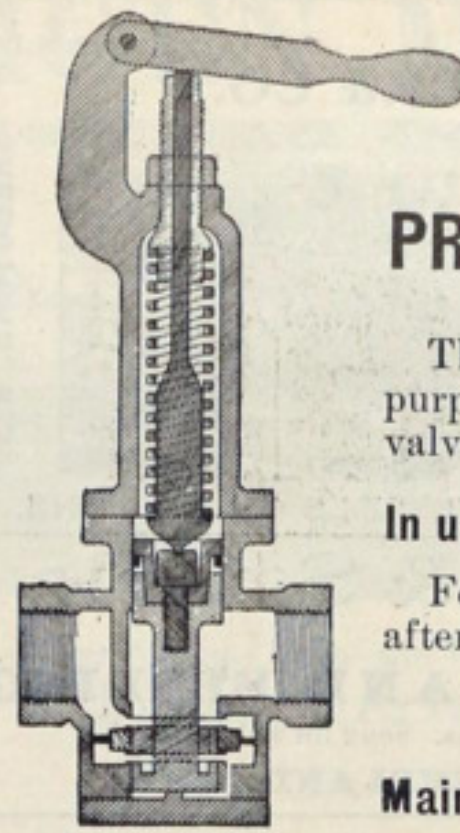
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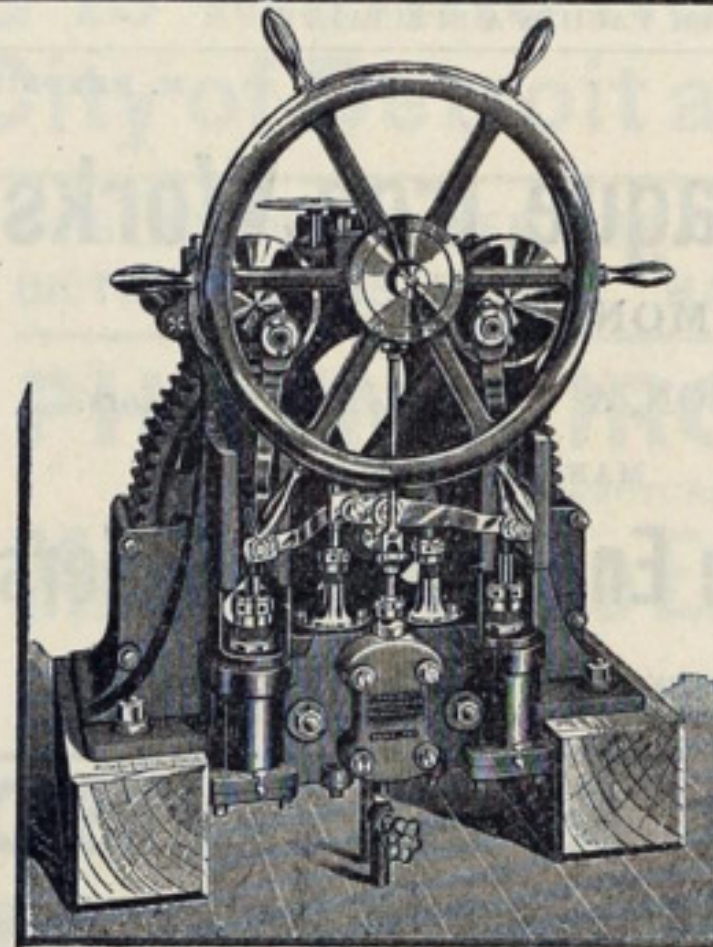
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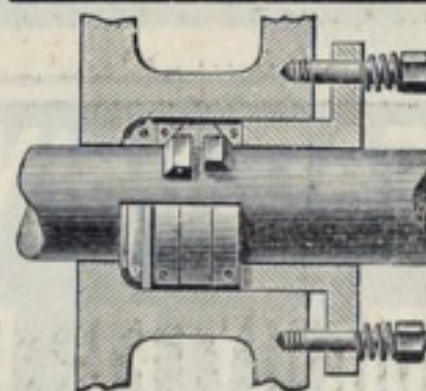
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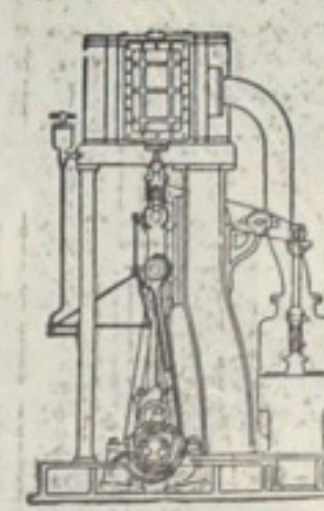
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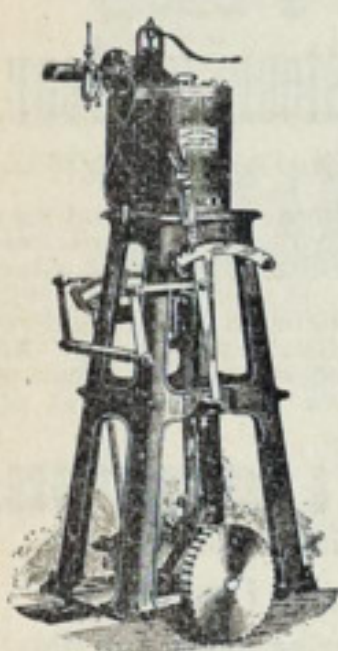
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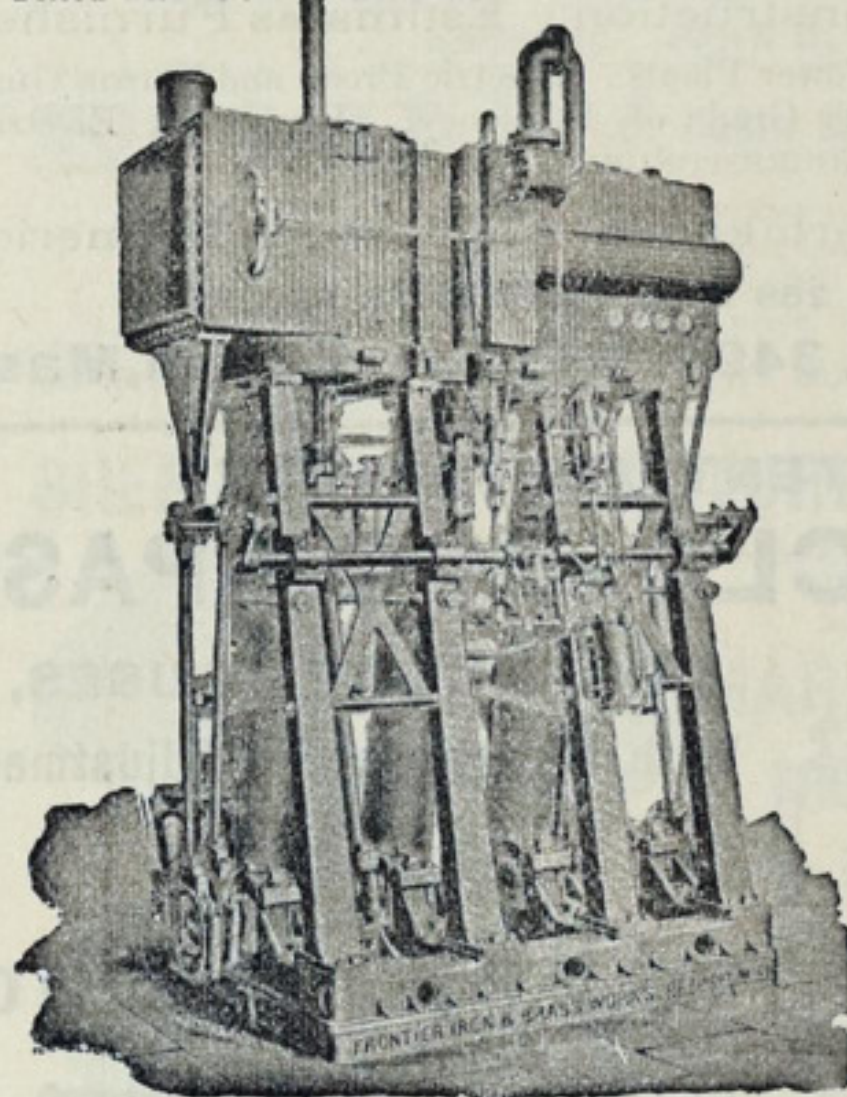
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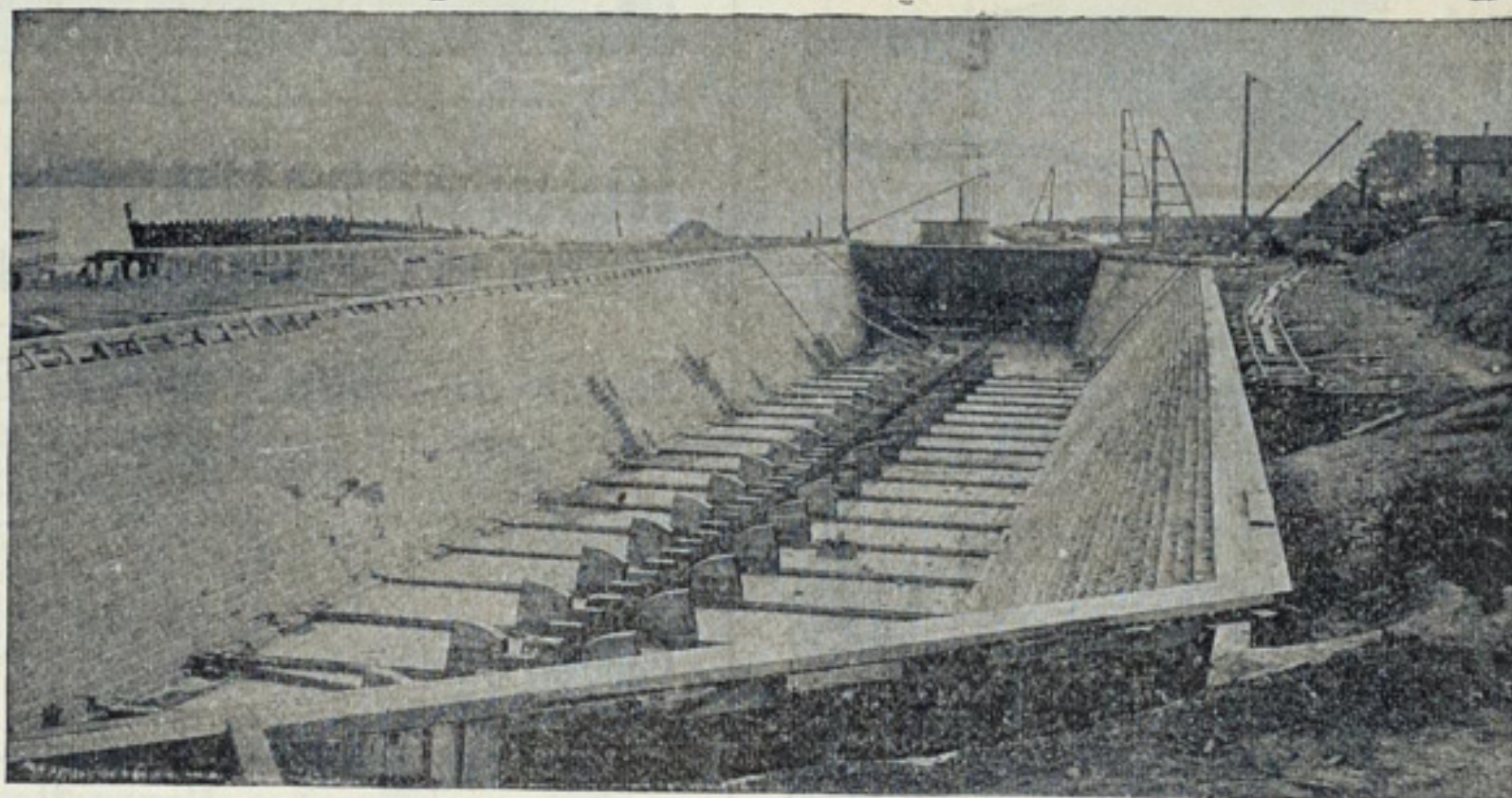
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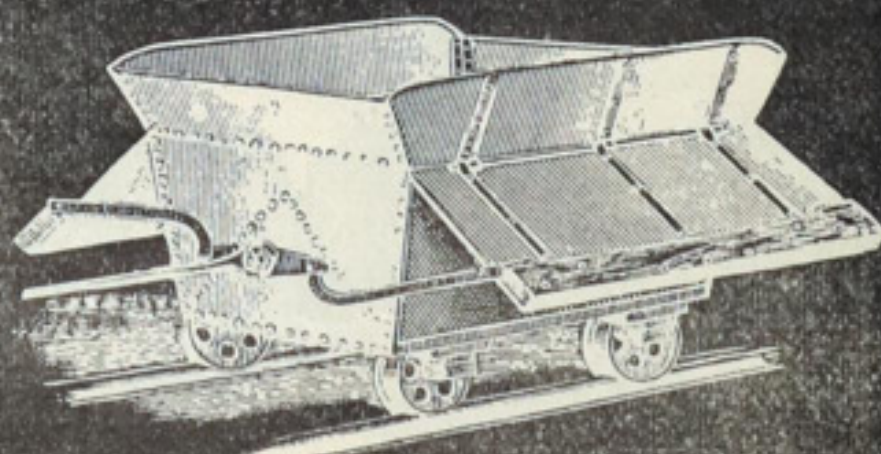
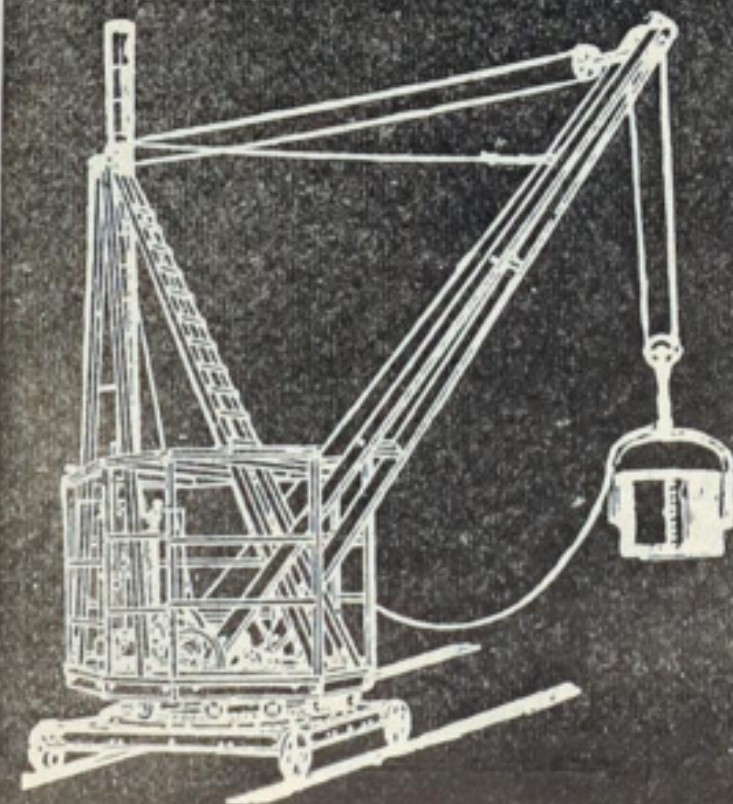
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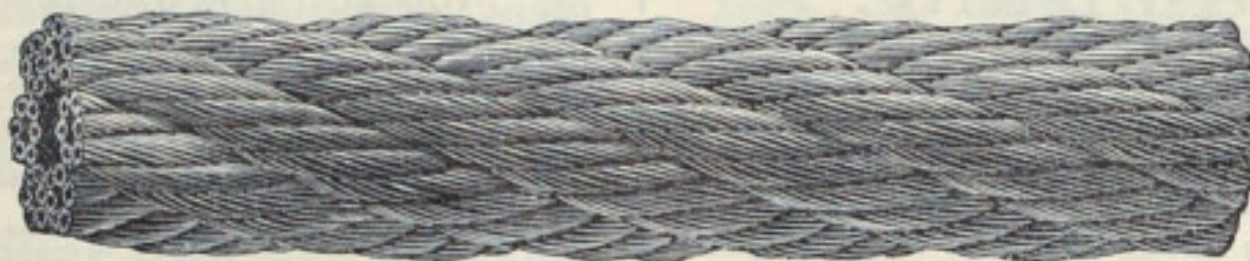
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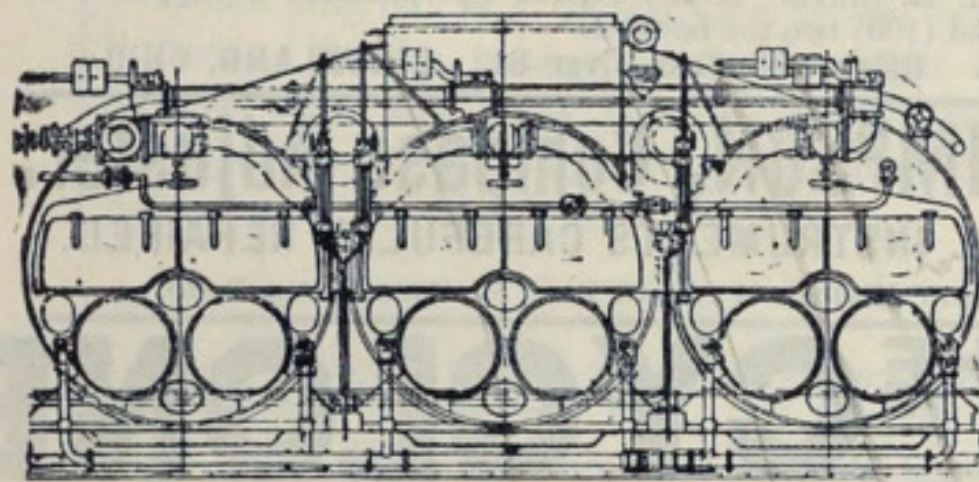
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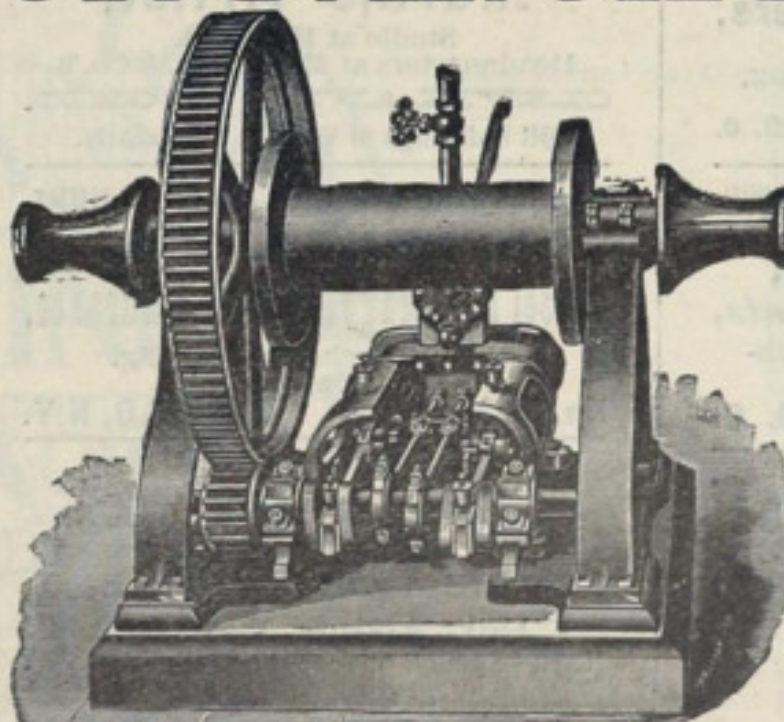
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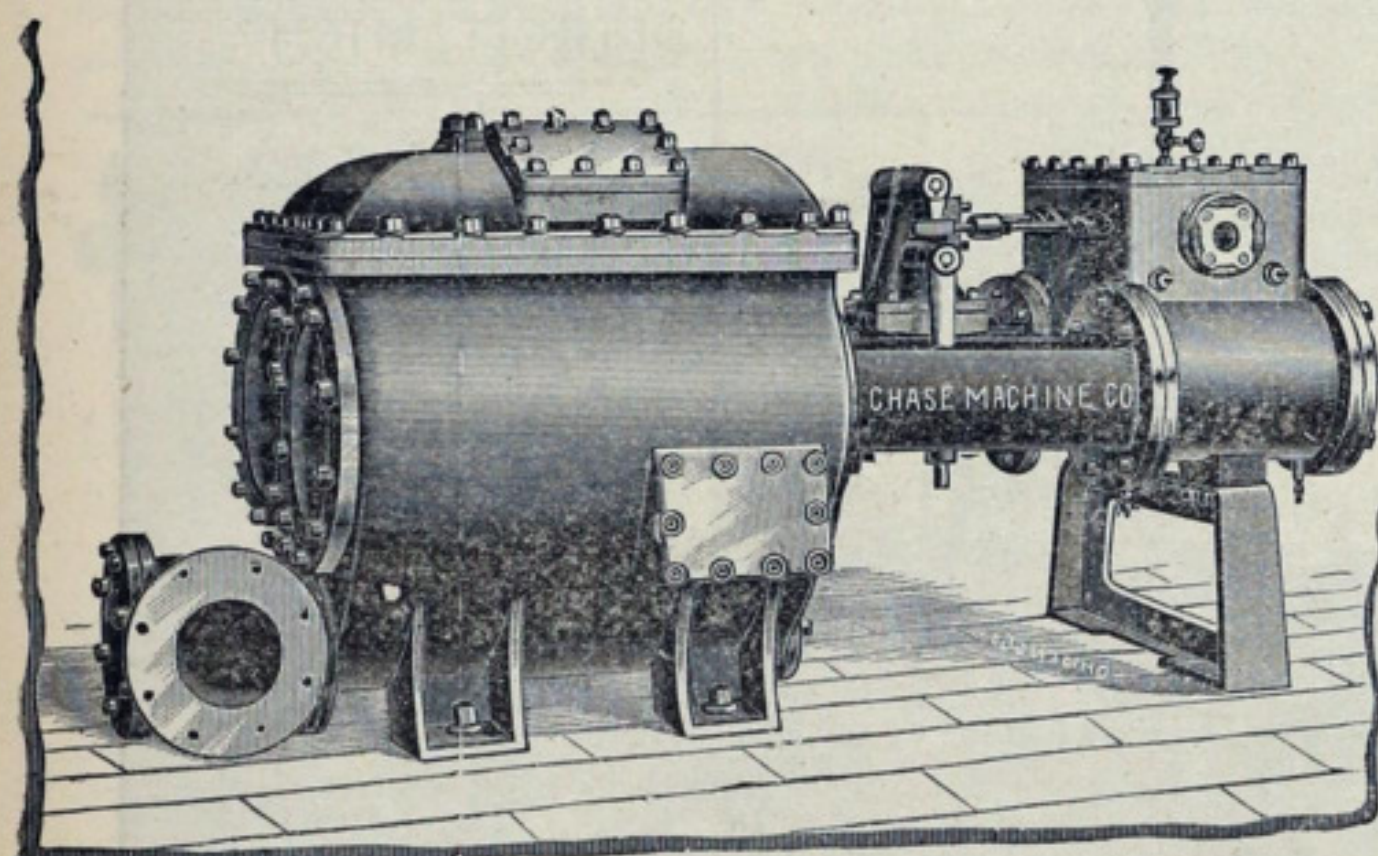
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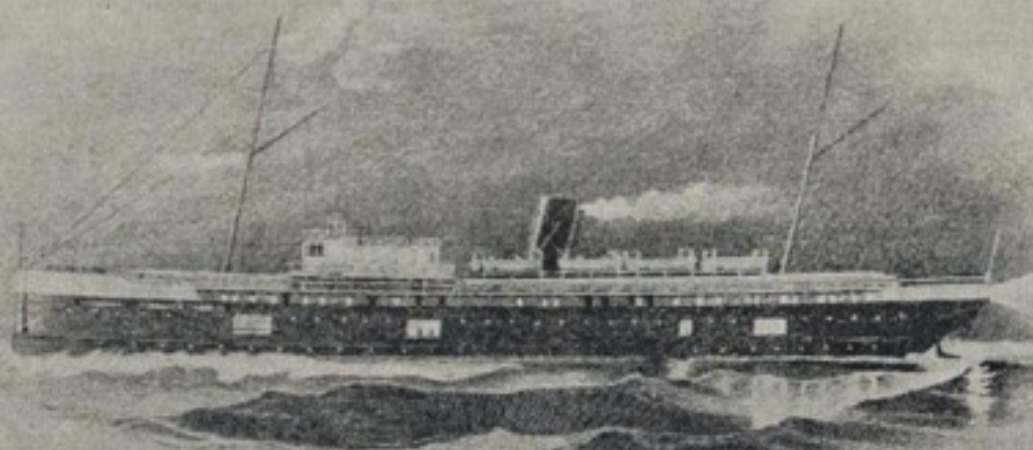
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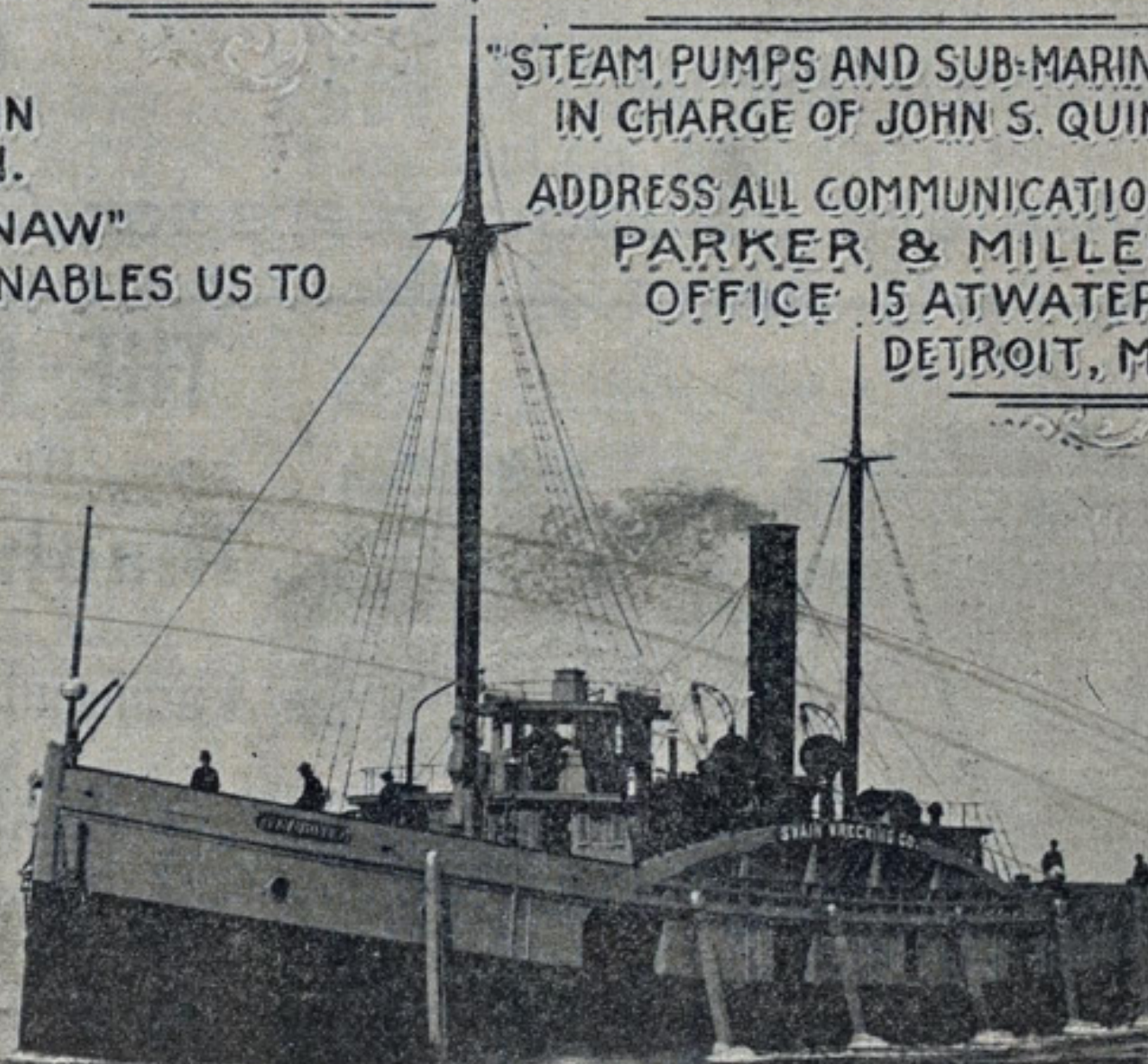
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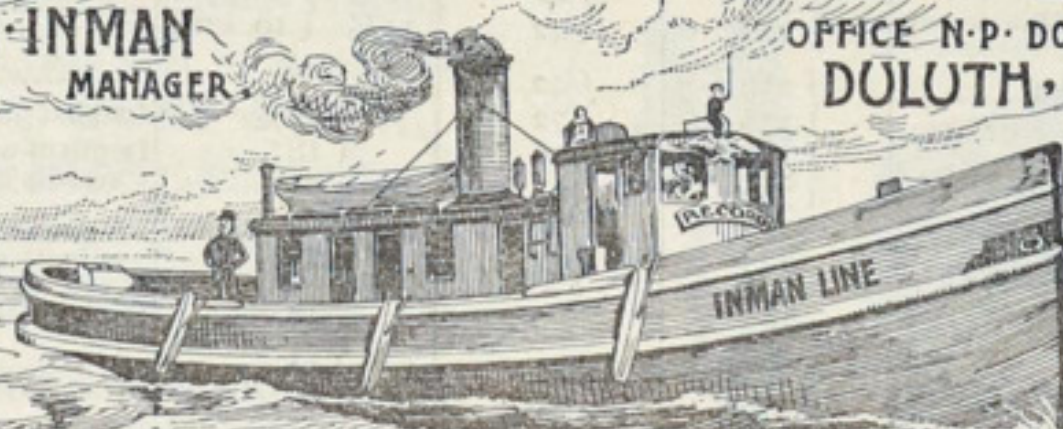
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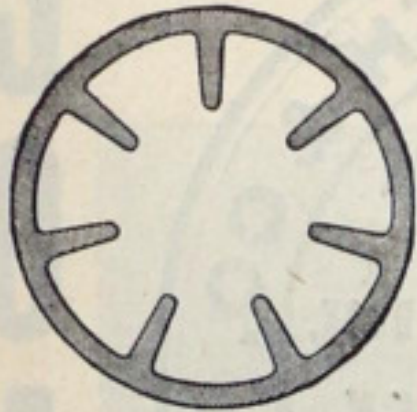
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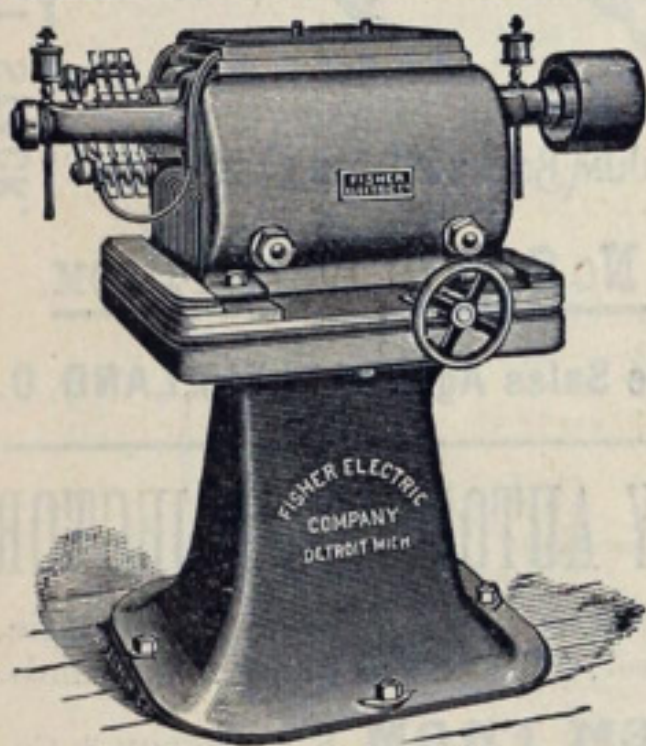
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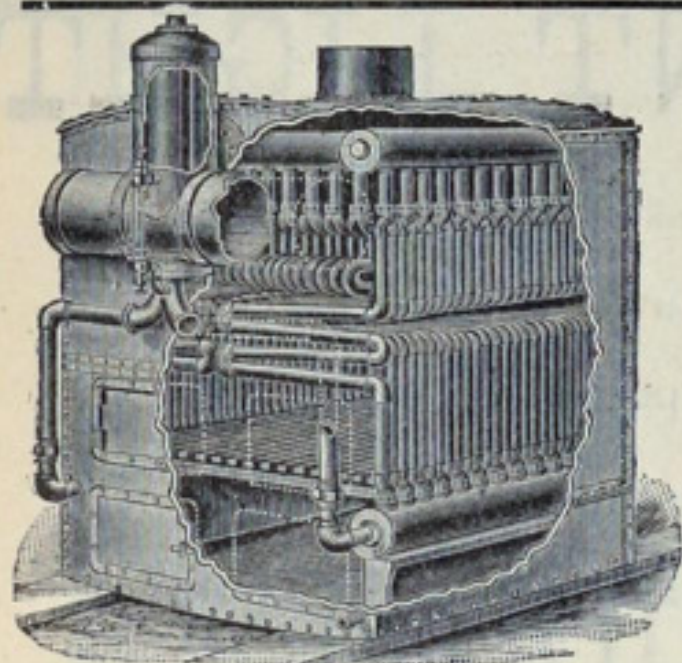
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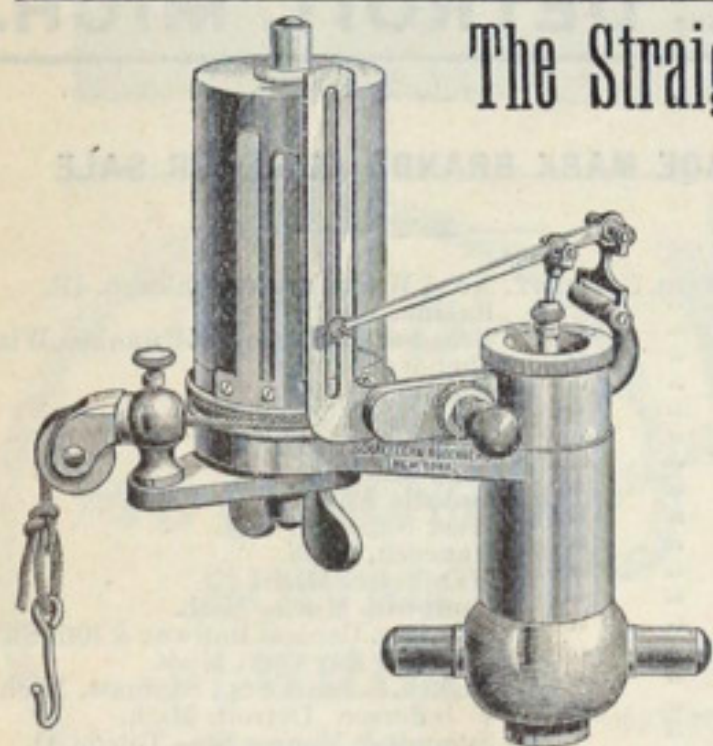
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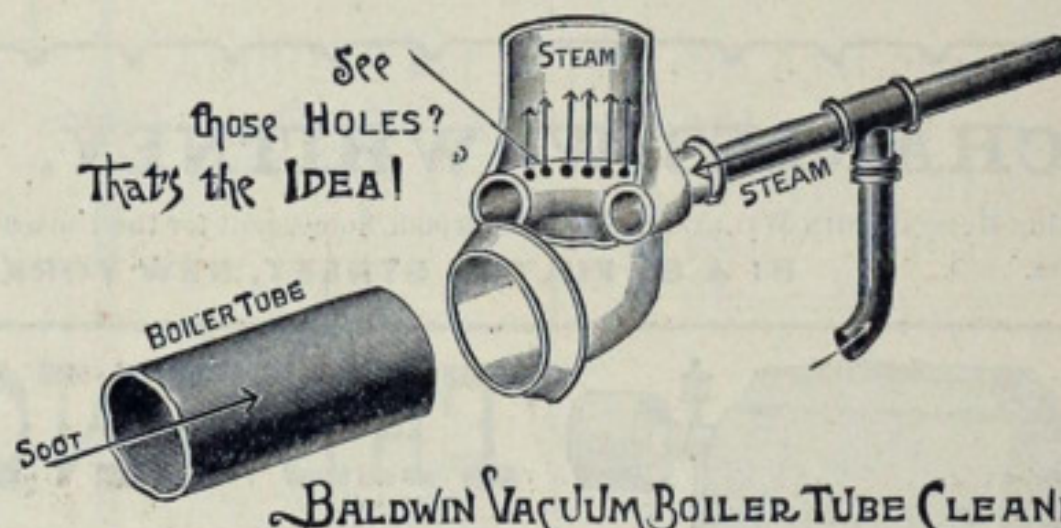
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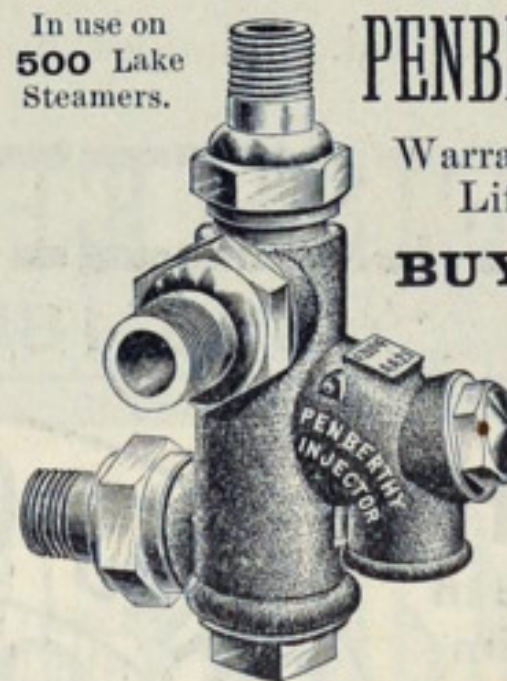


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